Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Sound Waves, Telephone Magazine and The Telephone

Vol. XVII **CHICAGO, SATURDAY, MAY 15, 1909** **No. 20**

PUBLISHED EVERY SATURDAY BY THE

Telephony Publishing Company

Monadnock Block, Chicago

Telephone Harrison 2951

H. B. McMeal, President **F. S. Kenfield, 1st Vice-President**
W. H. Graffis, 2d Vice-President **H. D. Fargo, Secretary-Treasurer**

Edited by H. B. McMeal and Franklin H. Reed

The present publication comprises

Vol. 56	The Telephone	No. 20
Vol. 33	Telephone Magazine	No. 20
Vol. 19	American Telephone Journal	No. 20
Vol. 17	Sound Waves	No. 20
Vol. 17	Telephony	No. 20

TERMS OF SUBSCRIPTION:

United States, Cuba and Mexico.....per year, $3.00
Canada 4.00
Other Foreign Countries within the Postal Union..... 5.00

NOTICE TO ADVERTISERS

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements accepted up to noon of Monday for the paper dated Saturday of the same week.

Copyright, 1909, by Telephony Publishing Company

Entered as second-class matter September 4, 1908, at the post office at Chicago, Ill., under act of March 3, 1879.

CHICAGO, SATURDAY, MAY 15, 1909.

CONTENTS.

Editorial 561
A Successful Exchange in Missouri.....563
Independent Service in Big Business Houses.....565, 566, 567
History of the Automatic Telephone. By Arthur Bessey Smith.568
The Relation between the Accountant and Engineer in Construction, Maintenance and Operation. By F. G. Simmons..570
Central Office Locations. By S. D. Levings.....572
Annoyances in Automatic Systems. By James Mooney.....573
Letters on Practical Subjects.....575
The Telephone in the Courts. By A. H. McMillan.....576
Practical Questions and Answers.....577
International Association Active in Chicago Telephone Complications 578
Telephone News 578, 579, 580, 581, 582, 583, 584
Telephone Patents. By Max. W. Zabel.....584, 585
In the Manufacturing Field.....585, 586, 587, 588
Condensed News Reports.....588, 589, 590

Enforcement of Penalty for Purchasing a Competitor.

Anti-trust laws, when efficiently enforced, are useful in preventing monopoly and protecting Independent telephone interests. A recent case in the Circuit Court of Lauderdale County, Mississippi, affords an illustration of the efficiency of such laws, and also discloses the reluctance of monopolistic interests to have adverse precedents established.

The suit was by quo warranto, brought by the Attorney General of the state by information, alleging that the Cumberland Telephone and Telegraph Company had violated the state anti-trust laws by purchasing a competing corporation, which was at the time engaged in the telephone business in the city of Meridian. The statutes of the state make it unlawful for any corporation to purchase the franchise, the assets, or the stock of any competitive corporation engaged in the same kind of business. The penalty prescribed is a forfeiture of the charter of a guilty domestic corporation, or the forfeiture of the right to do business in the state of a foreign corporation, and under the law existing at the time of the illegal purchase, the guilty corporation could be either ousted from the state or fined by the court. The Cumberland Telephone and Telegraph Company was found guilty as charged in the information, and the court assessed a fine upon it of $2,500. It is said that the company will pay the fine without prosecuting an appeal to the Supreme Court, evidently being anxious to avoid the establishing of a precedent in a court of last resort.

Many states have similar laws which can be made use of by Independent interests in this way, to protect themselves against their common enemy, the Bell would-be monopoly.

N. B. There is now another Independent company at Meridian, doing a large part of the telephone business of that city.

Profits in Local Tolls—Loss in Free Switching.

Free switching to other small companies, and free county service where one company owns all the exchanges, are given in so many localities that it will be a long time before the evils of the practice will be generally recognized. Once in a while, though, a member of the advance guard speaks out at a convention.

At the recent Ohio convention Mr. H. L. Beatty went to the root of the matter when he said:

"One of the great questions affecting the telephone industry is money—how to get on a good, sound financial footing. We

have up in Portage county a situation that is equaled in very few counties in this State. We get a good many thousand dollars every year from tolls between the little towns in Portage county. If you gentlemen are suffering from free business between your towns, and would look into the situation, you would find a great chance for profit. There is more money to be made in the toll business between your little towns than there is in the long distance over the United States' (the Ohio long-distance company lines.) We had three times as much business over our local lines, taking in three times as much money, as the United States Telephone Company earns over its lines that come into our county. That is something for you to study over, and many of you can increase your revenues by looking into that little matter."

Mr. William Crownover's paper read at the Iowa convention, and printed in TELEPHONY two weeks ago, is another valuable contribution to the printed literature on this subject. It will be recalled that Mr. Crownover said he found it easy to convince an infrequent user of the toll lines that a charge for each message switched to another exchange was fair. And wherever an appeal to the sense of justice and fairness is made, in a general way, so that public sentiment is aroused to back up the company, the large users of trunk wires simply have to get in line. After they have been on a "fair interchange" basis long enough to see what an improvement it enables the company to make in their service, they like it, too.

The business principle which lies at the foundation of this whole question is that the man who has occasion to talk to neighboring towns often, on business, can afford to pay for every message if he gets good service; while the man who has no business to talk about cannot afford to pay the higher flat rate required to maintain "free interchange," of which the large user gets the chief benefit, principally at the small user's expense. We should like to have a chance to discuss this question further with telephone companies which are giving free interchange, and to receive more letters for publication on the subject. Let us exchange ideas on this for a while, and see what will come on it!

The Legal Status of Eavesdropping.

From the standpoint of good manners, eavesdropping at the keyhole, or over the telephone, has always been reprehensible, and the practice is now being relegated to the field of unlawful and immoral conduct by being made a misdemeanor in the legal system of some states. The new Ohio statute is a leader in this direction, and deserves imitation by other progressive commonwealths.

The passage of such laws will modify the rule of evidence recently established by the Supreme Court of New York in holding that conversations over the telephone may be corroborated in court by a witness who "eavesdrops" over the wire. When eavesdropping has been made a misdemeanor, such testimony will no longer be admissable.

The passage of such laws will also be a protection to the telephone company from a possible situation like this: Suppose I am receiving certain important private information over the telephone, and through some crossing of wires, my rival overhears and takes advantage of it. I am financially injured and bring suit for damages against the telephone company. While no such case has ever arisen so far as we know, here is the possibility of a serious complication for the telephone company.

Possible domestic dramas may also be avoided. For instance, as a contemporary suggests, suppose A, telephoning from the city to his wife, to say that he will be detained at the club that evening were to be switched into the middle of a compromising conversation between Mrs. A and that old friend of the family, B!

Noisy Lines.

Of all the annoyances to which a subscriber is subjected by the inefficiency of the management and employees of telephone companies, next to the "wrong number" nuisance, there seems to be none more urgently demanding correction that that arising from noisy line conditions. It is true enough, perhaps, that the most sensitive nerve in a telephone subscriber's anatomy has one end in his cash pocket; but some of us have been a long time learning that the other terminal is in his ear. Anyone who has been among subscribers, and heard their complaints just after an exchange has been changed over to a common battery system which gives the subscriber a "bang in the ear" can confirm this.

It is of little use to urge courtesy of expression and the use of gentle tones upon the operators, if these must penetrate a trolley wire or incandescent light hum before they can reach the sensitive ear of the man at the other end of the line. It is time for the management of all exchanges which have noisy lines to realize where their responsibility rests, and then assume it like men and get after their troubles in a spirit that will keep everybody on the job until the faults are exterminated.

A wire chief who will listen to a rumble suggesting a brass band playing in a machine shop, and say that it is the fault of the electric light company—"Induction, you know. We can't get rid of it"—would better quit reading about the higher theory of alternating current and go back to work with pliers and screwdriver for a while. Two-thirds of this kind of noise can be eliminated by clearing up grounds on the system, and keeping them cleared. The thing to do is to begin with the worst lines, one at a time, and keep at them until a voltmeter backed up by plenty of battery will stay where it belongs on an insulation test. That cuts out the trouble arising from conduction. This last word may not suggest that the speaker possesses as mysterious knowledge as the word "induction," but when the fact penetrates into a man's brain that it can cover just as great a multitude of sins as its phantom relative, he has made a long stride toward improving his standing as a reliable telephone electrician.

Of course, after all the faults which appear on the surface have been cleared up, there may be a few which require modification of the construction, but no such changes are likely to cost as much as the dissatisfaction which arises from noisy lines. When a man not only has to submit to inconvenience himself, but annoy his correspondent at the other end of the wire, he is not going to do much business by long distance telephone. The cost of several weeks' extra maintenance work usually comes back in a few months in the shape of larger toll receipts, to say nothing of the probability of more numerous installation orders.

A Successful Exchange in Missouri

Actual experience has demonstrated repeatedly that one of the greatest factors in the success of a telephone exchange is local ownership, and management by people who are identified with the other successful commercial enterprises of the city in which it is located. When an Independent exchange is started to supply a strongly felt need for good service at reasonable prices, and continued as a strictly home enterprise, its future is assured. Among the companies which have enjoyed this enviable position the Independent telephone company at Holden, Missouri, has its place.

The Holden Home Telephone Company was organized in December, 1900, more as a matter of a public spirited enterprise than as a business venture, because the town needed telphone service. The Bell telephone company, or rather the Missouri and Kansas company, a Bell subsidiary, having raised its rates to a price which the people were unable to pay, was obliged to take out its telephones and abandon the town. Business for the Home company began with forty subscribers on an automatic switchboard limited to one hundred lines. The service being satisfactory, the system grew rapidly and the automatic switchboard was soon outgrown. It was replaced by a three hundred line magneto board. The business continued to grow, and as it was reasonably profitable, and the value of its service gained a good reputation, the company began to extend its field of operation, taking in the Centerview Telephone Company at Centerview, Mo., and installing switchboards in all of the small villages and post offices around it in each direction. In 1907 the magneto board was outgrown, and a contract was made with the Century Telephone Construction Company, of Buffalo, N. Y., for a three section common battery board and auxiliary equipment, which were installed in December of that year. At this time were installed a complete power plant, main distributing frame, chief operator's monitoring and toll desk, and a wire chief's desk.

The equipment is shown in the accompanying views. An interesting feature which they reveal is the sunny operating room, which is not only of ample size for the board it contains, and well lighted, but is neatly decorated, so that the operators find their surroundings attractive while at work. This is evidently one of the companies whose management realizes how much the operators have to do with the success of the business, and is willing to assist in making their work pleasant, so that it will be attractive to girls capable of giving a cheerful, intelligent service to its patrons.

The workshop, in which are a lathe and full set of tools, is unusually well equipped for an exchange of this size, and is a valuable factor in maintenance work. The general neatness and orderly arrangement of each department are apparent to anyone who examines the views taken in different parts of the exchange.

Views in the Central Office at Holden, Missouri, Showing Business Office and Equipment.

The Holden Home Telephone Company is at present furnishing service to some twelve hundred subscribers in the west half of Johnson county, and has toll lines reaching surrounding towns, where connections are made with other local companies for short haul business. The long haul business is handled over the lines of the Kansas City Long Distance Telephone Company, which provides three copper circuits, by means of which subscribers reach practically all points with which they have any possible occasion to talk.

The Bell telephone company having finally realized that with the exchange business goes the toll business, and not being able to effect a connection with the Home company, encouraged the organization and building of a Farmers'

Mutual competing plant. This plant has served as an incentive to the Home company to maintain its already excellent service, and has indirectly been the means of largely increasing its list of subscribers. The Home Telephone Company is, therefore, a believer in competition in the

Mr. M. L. Golladay.

telephone business, and thinks that, as Mr. G. R. Johnston wisely said, "Competition never divides a satisfactory service."

The Home Telephone Company is managed by Mr. M. L. Golladay, president of the Missouri Independent Telephone Association and a member of the directorate of the International Independent Telephone Association.

Features of a Good Telephone Directory.

The New Haven Telephone Company, Beatrice, Neb., is one of the companies which not only uses space in its directory for advertising its own business, but does this in a particularly interesting way. By this time telephone men are generally familiar with the cover of this book, which bears a modified Shield containing a map of the company's toll lines, with a statement that the New Home Telephone Company furnishes a "Short line to all points in Gage and adjacent counties."

The first page of the directory contains general instructions relating to service matters. On further turning the pages of the book we find a statement that the information bureau furnishes its patrons items of local interest, the time of the day, etc., all information concerning service which may be required. The second division of the book is a list of the points to which long distance connections are most frequently used by patrons.

An innovation in directory making is the placing of the "classified list" at the front of the book. On one page appears a view of the subscribers' switchboard in the exchange, accompanied by the statement: "The satisfying influence of good service is the important factor of rapid growth. Ambitious and intelligent application by our employees, with modern methods and apparatus, makes good service at all hours possible."

The left hand pages of the book contain advertisements of its long distance connections and extension sets, and bring other matters to the attention of subscribers. Among the commendable phrases are the following:

"Direct long distance lines to Lincoln, connecting with automatic exchange. Fine service. Have you ever tried it?"

"Telephones for everybody. First class long distance connection with Omaha, St. Joseph, Atchison, Leavenworth, Lawrence, Topeka and Kansas City."

"Busy lines prevented by not calling non-subscribers to your telephone. A telephone will cost him no more than your costs you. A telephone is the door to your establishment through which business enters. If the line is often 'busy' the door is often closed. Prevent this by sending us the names of non-subscribers who often close the door. Your name will not be mentoined."

"An extension is a second telephone connection to your main line and placed where you will have the most use for it. The cost of an extension telephone is only 50 cents per month."

"Your neighbor should have a New Home Telephone."

"The Greater Telephone Service in Gage County via Independent Long Distance."

The local exchange rates are published on the back of the directory.

Mr. W. H. Caman, manager of this company, is a firm believer in the value of advertising to the telephone company, and finds the use of his directory for this purpose a desirable aid to the extension of the business of his exchange.

Indiana First District Meeting.

Unusual interest was manifested in a meeting held by the members of the Indiana Independent Telephone Association for the First District, embracing the northern counties of the state, on April 27. Vice-President Theodore Thorward presided. The morning session was given up to the hearing of the reports of progress from the many managers and superintendents present. For the most part these reports showed progress and a healthy state of business among the companies. The report of Vice-President Thorward was unusually interesting and awakened applause because of the great progress made in and near South Bend and the announcement of additional improvements to be made this year, including the construction of several toll lines.

During the afternoon session Mr. J. W. Coffey, of Indianapolis, manager of the Clearing House, made a detailed statement as to what has been accomplished in the state, adjoining states and the eastern states in the making of uniform and equitable toll rates and the working of the Clearing House. Mr. Coffey made it clear to the members that the Clearing House was a great necessity, and would be conducive to the building up of the greatest co-operative telephone system in the world.

Delegates were selected to attend the annual meeting at Indianapolis, after which, by resolution, the present officers, Theodore Thorward and A. J. Riddle, were continued as president and secretary respectively for the ensuing year.

Independent Service in Big Business Houses

The Reasons Why Leading Firms of Buffalo, N. Y. Will Not Do Without it are Shown in the Following Correspondence, Which Led to its Restoration in the American Express Offices

The American Express Company has been clearly shown that it cannot afford to discontinue the Independent telephone service at Buffalo, N. Y. The story of the attempt of the local office to do so, and why it did not, is graphically set forth in the following abstracts from the correspondence of some of the leading business houses in Buffalo which would have been injured by the change.

The first action was taken by the local express agent, in the following letter:

January 19, 1909.

Managers, Frontier Telephone Company:

I believe the contract in force between your company and ours for telephone service will expire on February 28th next. I beg of you to accept this letter as formal advice that it is our desire to cancel the contract now in force and which will expire by limitation on February 28th next.

Kindly acknowledge receipt of this letter and be prepared to take out your instruments without further advice and as soon after the expiration of the contract as circumstances will permit. Yours truly. (Signed) C. A. Dougherty, General Agent.

To this letter Mr. G. Barrett Rich, Jr., general manager of the Frontier company, replied on January 20, the next day, that service would be discontinued and instruments removed on the day the contracts fell due.

Knowledge of the intention to discontinue the Independent service soon spread about town, but the first written protest which can be located is that of W. H. Walker & Co., wholesale dealers in boots and shoes and heavy patrons of the Frontier Telephone Company and also of the American Express Company. This firm, on January 25 wrote the local express agent, saying:

"We were very sorry indeed to be notified that your company would discontinue the use of the Frontier telephone after February, 1909. In our ordinary business transactions, we very much prefer the use of the Frontier telephone, and it would seem as if your company was discriminating against proper competition by ordering the discontinuance of the Frontier telephone. We can only say that if this information to us is correct, and that you do discontinue the use of the Frontier telephone, it will cost us more to do business with you over the Bell telephone line, than it otherwise would over the Frontier telephone line. It has always been our custom to give your company the preference. We sincerely trust that no arrangement will be made that will cause us to feel justified in doing otherwise."

This evidently put the argument on a little higher ground than the local agent cared to tread upon unless assured of the backing of the general officers. Here is the reply to Messrs. Walker & Co., dated Jan. 30, 1909.

"Your favor of the 25th inst., addressed to the agent of our company at Buffalo, has been referred to me.

"In reply I beg to state that the action taken in regard to removal of the Frontier instruments is not in any way intended as discrimination against proper competition. The necessity for economizing has been impressed upon us by recent depression in business and, in looking over the different items of cost attending the operation of our business, we found that many of our offices had more than one telephone, because some of our patrons thereat used the instruments of one telephone company and others another. As a general proposition, telephone service at our offices is for the exclusive benefit of the public, we having relatively little occasion to use it. We recently made it a rule, therefore, that we would subscribe to but one telephone—the telephone having the larger number of subscribers among our patrons to be selected for the purpose. We have no desire to take out the Independent telephone any more than those of the Bell company, provided the former have the larger number of subscribers among our patrons, but this is not the case at Buffalo.

"I trust after mature consideration, you will perceive that our attitude is perfectly reasonable in this matter and will favor us with a continuance of the patronage of your firm valued very highly by us in the past. Yours truly. (Signed) T. A. Ritson, Asst. Gen'l Mgr."

At this point the Frontier Telephone Company was called in consultation, on account of the character of Mr. Ritson's comments on telephone conditions.

Mr. Rich, on Jan. 30, having before him the traffic department's records of the Express company's traffic, wrote to Assistant General Manager Ritson as follows:

"Your letter of recent date to one of our subscribers in reply to their protest against your discrimination in favor of the Bell company, has been referred to me.

"I am surprised that you claim this change was made on the ground of economy, in view of the facts which must have been submitted to you. For example: During the past five days, during which we have kept careful records of your 'incoming' and 'outgoing' calls, and find your Main and Erie streets office has sent out over our lines on an average of 57 calls per day. On a basis of 300 days to the year, these calls, if transferred to the Bell company at their minimum rate of three cents (3c) per message, would cost your company $513, not allowing for the additional Bell trunk lines and instruments which will be necessary for you to pay for in order to properly handle so many additional calls.

"In view of the facts that you are paying this company $305 for unlimited service, and the further fact that your company is dispensing with the service of Independent telephone companies in places where Independents have from five to ten subscribers to one of the Bell, I trust that in future in giving your reason for this discrimination you will be fair enough to state the facts as they exist and not endeavor to belittle the value of Independent telephone service.

"I might add that during the same past five days, you have received over our lines at your Main and Erie streets office, an average of 154 calls per day which I am reliably informed, is about double the number you received from the lines of the Bell company. These calls the shippers of Buffalo will have to transfer to the other company at a cost to them, at this rate, of at least $1,386 per year, if they still continue to communicate with your office."

How it actually did appeal to the business men is clear enough. Read some of these:

Feb. 2, 1909.

"Agent American Express Co., Buffalo, New York.

"Dear Sirs:—We have recently been informed that your company has decided to discontinue Frontier telephone service, which means an added expense to ourselves and

everyone else who has occasion to communicate with you by telephone. You of course understand how our inability to communicate with you over the Frontier telephone increases our expense in doing business inasmuch as the Frontier company gives us unlimited service at a flat rate, while the Bell company charges for each and every message.

"The cost of a single telephone message is but very little, but we find that it comes quite natural for us (and we presume others experience the same thing) that in buying goods we are quite apt to use the Frontier telephone because everything else being equal we save the price of the telephone message anyway by using the Frontier, and we do not know why in a competitive business we would not act on the same principle when calling up an Express company.

"We earnestly hope your company will reconsider the matter and continue the Frontier service. Respectfully. (Signed) Potter & Williams."

The above was from a firm of commission merchants doing a large business.

Feb. 6, 1909.

"American Express Company.

"Gentlemen:—We find that you have eliminated the Frontier or Independent telephone service from your offices.

"We find that the Frontier service, besides being better, is recognized as the 'Express' business service of Buffalo.

"There are a great many business firms, including ourselves, who retain the Bell telephone only on a minimum rate of service, and, therefore, use the Frontier telephone almost exclusively. Naturally, we, therefore, do nearly all our business with companies having the Frontier service, and thereby save money on our telephone service.

"In our own case, we have a Frontier switchboard throughout our factories and but one Bell telephone, which is not conveniently located for our receiving and shipping departments. We have, therefore, issued instructions, until further advice, that both incoming and outgoing express is to be shipped over other lines than the American.

"Trusting that the decision is not final, and should you restore the Frontier telephone service to your offices that you will advise us, we are. Yours very truly, (Signed) C. H. Littell, Treasurer and General Manager, General Drop Forge Company."

Feb. 6, 1909.

"American Express Company, Buffalo, N. Y.

"Gentlemen:—We understand we will be unable to reach your office over the Frontier telephone on and after the 1st prox., and would like to know whether or not this is a fact. It hardly seems possible that your company, which stands here in Buffalo, at least, for so much that is progressive and careful in its care and attention to patrons, to take any steps that would seem to impair this reputation and policy which has been helped and stimulated through the agency of the Frontier Telephone Company.

"It is needless to say that serious inconvenience will be suffered by many of your clients, and it will also have a tendency to lessen the volume of your business. For best results co-operation is absolutely necessary, and as disinterested parties except in the common weal of our municipality at large, we feel you are making a very serious mistake in taking this step, if it lies within the power of your Buffalo office to prevent it. With the prevailing sentiment in town in favor of what the Frontier company has done, your action in this regard certainly will help your competitors considerably. Yours respectfully, John R. Keim Mills (Inc.), (Signed) J. R. Lee."

Following is one from a florist house which had been a frequent user of the express facilities in handing an important class of its business:

Buffalo, N. Y., Feb. 9, 1909.

"Mr. C. A. Dougherty, Agent, American Express Company.

"Dear Sir:—Very much to our surprise, we are informed that you intend discontinuing the service of the Frontier Telephone Company. Its unlimited service has proved itself a saving of considerable amount to each and every merchant in Buffalo, and we regret to a great extent that the American Express Company should in a way burden the aforesaid merchant in obliging him to use a limited service telephone in calling up for such information as he may demand when the unlimited service of the Frontier Telephone Company was previously used to our great satisfaction, both financially and otherwise. Yours respectfully, (Signed) Palmer's."

Here is one from a firm whose cane furniture is known the world over:

Buffalo, N. Y., Feb. 6, 1909.

"American Express Company, Buffalo, N. Y.

"Gentlemen:—We understand that you are contemplating the removal of your Frontier telephones. As you undoubtedly know we are giving you the majority of our express shipments, and it is of considerable convenience to us to be able to call you on the Frontier telephone for the reason that we have a switchboard with a branch telephone in our shipping office, but have no Bell telephone there.

"Besides this on account of the limited service that the Bell company give, we would be charged for all Bell messages to you, which in a year would amount to considerable.

"We, therefore, trust that you will not take the contemplated step without serious consideration, and beg to remain. Yours truly, Heywood Brothers & Wakefield Company. (Signed) Ralph Kimberly."

Buffalo, N. Y., Feb. 2, 1909.

"American Express Company, Buffalo, N. Y.

"Gentlemen:—We regret that we have to write you in regard to a rumor which has come to our ears that you are about to discontinue the service of the Frontier Telephone Company. These may be orders which you received from New York which you will have to carry out, but as a matter of business we think you will make a mistake in doing so. While you may not use the Frontier service to any great extent yourselves and you may be able to get along entirely with the Bell service the customers with whom you are dealing all or nearly all have the Frontier telephone in their offices, and as the Frontier gives unlimited service, nearly all of your customers naturally would use the Frontier telephone in calling you. Personally, our business does not amount to enough so that we should put up a kick to you on this, but we are looking at it on a broader view than that, as we said before, as a matter of policy and as a matter of good business judgment that it would be better to keep the Frontier service in your office as a matter of accommodation to the large number of customers from whom you get your support in the city of Buffalo. We should feel very sorry to have you take this service out and would ask you to think the matter over and to reconsider if possible your decision in the matter. Respectfully yours. (Signed) Gleason & Lansing." (Commission merchants.)

A leading hardware merchant might be allowed some

justification for expressing an opinion on such an action of the express company. Here is one, from Walbridge & Company:

Buffalo, N. Y., Feb. 2, 1909.

"American Express Company, Buffalo, N. Y.

"Gentlemen:—We learn with regret, that your company is proposing to dispense with the service of the Frontier Telephone Company. While this, we presume, would make no pecuniary difference to your company it would make a very considerable difference to your patrons.

"As you are doubtless aware, we, in common with all the merchants and manufacturers of Buffalo, pay the Frontier a flat rate, whereas the minimum charge of the Bell company is three cents per message. For this reason the Frontier is the line most commonly used by all the business people of our city and we feel that your company are inflicting a hardship upon us in cutting us off from the use of the Frontier in communicating with your office.

"We trust that you will reconsider your decision and favor the business community here in this matter. Yours very truly. (Signed) Walbridge & Company."

Buffalo, N. Y., Feb. 2, 1909.

"The American Express Company, Buffalo, N. Y.

"Gentlemen:—We understand that you contemplate dispensing with the services of the Frontier Telephone Company and we are rather surprised at your action in this matter as we, and undoubtedly hundreds of other business concerns in the city prefer to use the Frontier telephone instead of the Bell for obvious reasons. We believe you will make a serious mistake in taking this action, as anything that tends to hamper your customers will naturally react upon yourselves. Believing it would be to the best interests of all concerned to continue the use of the Frontier telephones, we hope you will reconsider your decision in this matter and continue its use. Yours very truly. (Signed) Clawson & Wilson Company." (Wholesale dealers in dry goods.)

Buffalo, N. Y., Feb. 9, 1909.

"Mr. T. A. Ritson, Assistant General Manager, American Express Company, Buffalo, N. Y.

"Dear Sir:—We are credibly informed that it is the intention of the American Express Company to discontinue its Frontier telephone service after this month.

"We have recently made contracts for service with the two telephone companies, using three trunk lines with the Frontier and two with the Bell.

"From past experience, we expect that the Frontier company will handle two-thirds of our outgoing business. If you discontinue your Frontier service, we would inform you it will be a frequent source of annoyance to us. Yours truly, Collins Baking Company. (Signed) J. Archbald, Treasurer."

The house of Pratt & Lambert has a well known reputation as manufacturers of paints and varnishes, in which it does a heavy express business. Its president, on Feb. 8, wrote to the express company: "We find that for some reason you have discontinued the use of the Frontier telephone at your office, and we desire to call your attention to the fact, that every time we call you on the Bell telephone it costs money, and unless you put in a Frontier, we fear that you will lose, not only a large part of the business from this office but from our New York and Chicago offices as well."

Most of the letters show a decided preference for the Independent service. The following letter is therefore, original by comparison with the others, although the writer has good company among the thousands of good business men the country over who have observed the real results of the competition in the telephone business.

Buffalo, N. Y., Feb. 4, 1909.

"Mr. T. A. Ritson, Assistant General Manager, American Express Co.

"Dear Sirs:—We understand you have ordered the Frontier Telephone Company to remove all their instruments on March 1st, and the reason given is that you are trying to economize.

"Our experience has been that both telephones are necessary if you wish to practice economy. We have used both the Bell and Frontier for some years, quadrupling our service at a less cost than when there was no competition and we venture to say you will find the same result, if you will go into the matter carefully. It would be a sorry day for Buffalo, if the Independent Telephone Company should go out of business, however, there is no danger of that contingency.

"Have you taken into consideration what it means to compel all your customers to pay from three to five cents every time they wish to reach you or the National, when your competitors can be called for less than one third of that expense?? It looks like ten per cent on every thirty cent parcel.

"As firm believers in competition, and a patron of the American Express Company for fifty-two years, we take the liberty of respectfully protesting against your action.

"Yours very truly, (Signed) Plimpton, Cowan & Company." (Wholesale drugs and groceries.)

The preceding letters have been gathered, among others, and selected as typical of those sent to the express company by the large business houses who were its customers. Many protests were probably made in even more direct and forceful ways. At any rate, the situation was soon recognized as intolerable, and closed in the following correspondence:

Buffalo, N. Y., Feb. 10, 1909.

"Frontier Telephone Company.

"Gentlemen:—Please consider as cancelled the notice given you by our General Agent, Mr. Dougherty, under date of 19th ultimo, with regard to withdrawal of your Company's instruments at our Black Rock and Buffalo offices.

"Yours truly, American Express Company. (Signed) T. A. Ritson, Assistant General Manager."

Buffalo, N. Y., Feb. 10, 1909.

"Messrs. Clawson & Wilson, Buffalo, N. Y.

"Dear Sirs:—I am pleased to supplement my letter of Feb. 4th, by advising that upon further consideration of the matter it has been decided to retain the telephones of the Frontier company in order to provide for our patrons the service which they desire.

"Yours very truly, American Express Company. (Signed) T. A. Ritson, Assistant General Manager."

Buffalo, N. Y., Feb. 11, 1909.

"Mr. T. A. Ritson, Assistant General Manager, American Express Company.

"Dear Sir:—I was very glad to receive your favor of the 10th inst., notifying us of your intention to continue our service in this city, and I assure you it will give us great pleasure to do everything in our power to render this service of value to your company.

"Yours truly, (Signed) G. Barrett Rich., Jr., General Manager, Frontier Telephone Company."

History of the Automatic Telephone*

Party Lines—Miamisburg, Ohio

By Arthur Bessey Smith

Assistant Professor in Telephone Engineering, Purdue University

One of the attempts of telephone engineers to economize wire was the introduction of the party line. The saving was partly offset by the more complicated and costly apparatus required for selective ringing, yet the party line proved a money-maker and spread rapidly all over the country. The automatic system was built up on the idea

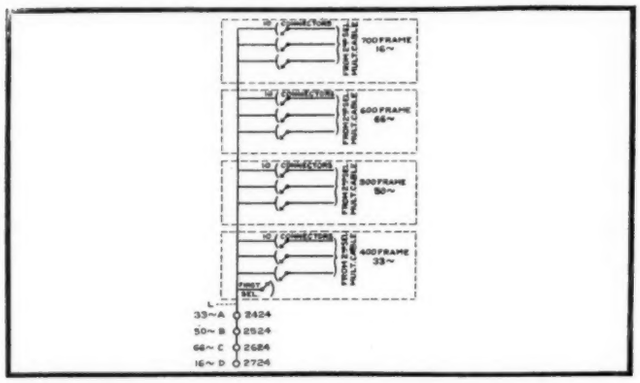


Fig. 112. Outline of Scheme for Ringing Party Lines.

of individual lines, that is, one subscriber per line. Naturally the objection was urged against the new system that it could not supply party line service. Though aiming at another end, it was necessary to meet this demand, and supply it until something better should be forthcoming.

In the main, two problems confronted the engineers. The first was the selective ringing of the called station without special manipulations on the part of the user. The second was to ring back on the same line that originated the call. The Thompson and Robes system, employing biased bells, two from each wire to ground, could not be used, since both wires must be clear for operating the switches. The harmonic system, which was developed by Mr. W. W. Dean, was the only one adapted to the purpose, being free from grounds at all times. Hence it was adopted.

The manner of allowing the calling subscriber to determine which frequency of ringing current shall be turned onto the called line is simple and interesting. Referring to Fig. 112, let the four rectangles represent four of the frames of an exchange, each frame holding apparatus for serving 100 subscribers' lines. We may suppose them to be in the second thousand. The connectors alone are represented, three of each being shown. The line *L* represents the line circuit, on which are four telephones. The four bells differ from each other in that they are tuned to ring on the frequencies set down opposite them. The first station, *A*, rings on 33 cycle current, *B* on 50, *C* on 66, and *D* on 16.

In the office the line *L* is multipled to the banks of all the connectors. Let us suppose that this line has 24 for its last two digits. It will then be wired to bank contacts 24 in each of the ten connectors in the 400 frame as shown. The same line is also multipled to contacts 24 of each connector in the 500, 600, and 700 frames.

The ringing relays of all the connectors in the 400 frame are wired with 33 cycle current, while the relays of the 500, 600, and 700 frames are supplied with 50, 66, and 16 cycle ringing current respectively. The result of this arrangement is that if any telephone in the exchange calls "2424", the switches will act as follows: The first digit will step his first selector up two notches and select a non-busy trunk to the second thousand in which the desired line ends. The next digit, 4, will trunk the connection to one of the connectors in the 400 frame. The last two digits, 2 and 4, will lift and rotate the wipers of this connector till they rest on contact 24. On pressing the ringing button the relay will send out on the called line, *L*, the only current with which it is supplied, 33 cycle. This current will pass through all the bells on the line, but will ring only the one at *A*, which is tuned to that frequency.

But if the number 2524 had been pulled on the dial, the call would have been directed into the 500 frame and would have ended on contact 24 of one of the ten connectors belonging to that frame. It thus gets to the same line, *L*. Since all these connectors are supplied with 50 cycle current, the act of ringing will send out that frequency, ringing the bell at *B*. It is perfectly obvious that station *C* may be called by the number 2624 and station *D* by 2724. To place the numbers in a form more easily remembered, they have been tabulated as follows:

Station on Line.	Call Number.
A	2424
B	2524
C	2624
D	2724

It is the "hundreds" digit which fixes the station called. By this arrangement the calling subscriber need not know that he is calling a party line, for the call number will have nothing about it to mark it as different from "straight" or "special" individual lines.

For calls proceeding from any station on the party line, one first selector is provided as indicated. In the same way 99 other 4-party lines are wired up in the four frames. Each of the frames will have the full number of second selectors and connectors, but only 100 first selectors are required. The 100 party lines thus handled occupy as many call numbers as if all the 400 stations were on individual

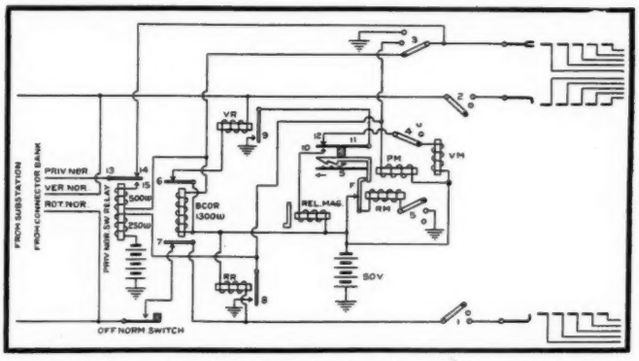


Fig. 113. First Selector for Party Line. First Installed at Miamisburg, Ohio.

lines. But it will be noted that there is a saving of 300 first selectors and 300 line circuits in the wire plant.

THE REVERTING CALL.

Suppose that a person desires to call a station on his own line. He will pull the first digit calling for his own thousand, for example, 2. A ground is thus placed on his

*Continued from issue of May, 1909.

own private wire which is multipled to contact 24 of each of the connectors in the four frames. Any call coming in through them will strike this ground, release the connector and give the busy tone. His next pull will trunk him to one of these connectors corresponding to the frequency of the desired station. When he pulls the last two digits, he will be connected to his own line, but this has been made busy by the act of calling, so that the call cannot be completed.

The problem was to devise a plan whereby this ground could be momentarily taken off the private normal, to allow the connector to get in if the call came back to its own line. The means are shown in Fig. 113. This is a bridging first selector such as was installed at Miamisburg, Ohio, June, 1905. It was a 1,000 system, and therefore had only first selectors and connectors. The vertical and rotary lines from the substation come in at the left. The vertical line normally goes through the vertical relay to negative battery, which it gets through contact 6 of the bridge cut-off relay. The rotary line is open at the off normal switch, but if the latter be closed connection is had to negative battery through contact 7 of the bridge cut-off relay and winding of the rotary relay. The rotary relay contact, 8, controls the private magnet as usual. The vertical relay controls the vertical magnet, but if the private magnet be energized it will ground the release magnet through contact 10 of the private magnet.

The bridge cut-off relay is used to cut battery off the line when receiving a call, and is wired from negative battery to the first contact of side-switch 3.

The real innovation consists in the addition of a private normal switching relay, which handles the private normal wire in the manner which will be described. Its armature, or main spring, 13, is wired directly to the private normal, which it connects through back contact 14 to the private wiper. The front contact, 15, is connected through a 500 ohm winding to the end of the bridge cut-off relay which goes to side-switch 3. The 250 ohm winding runs from negative battery to main spring 8 of the rotary relay, so that it is under the control of the latter, as is similarly the private magnet. Every time the rotary relay energizes it pulls up simultaneously the private magnet and the private normal switching relay, since they are in parallel.

The connector, Fig. 114, differs little from the bridging type which has been described before, but the changes are very important for the operation of party lines. The rotary relay carries an extra spring and contact, which are looped into the release magnet circuit. The release magnet is made to release the connector switch on pulling up, not on falling back, as in other switches. On the wiper

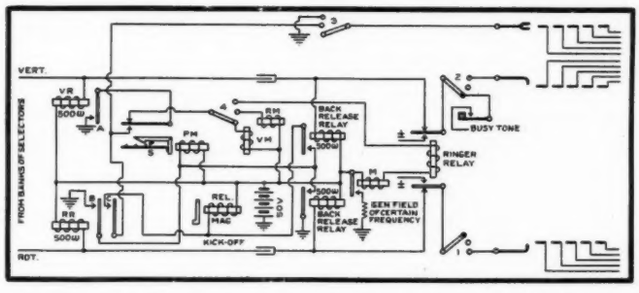


Fig. 114. The Miamisburg Type of Connector for Bridging Party Line.

side of the condensers are bridged the two back release relays, each 500 ohms, so that the called subscriber can release if necessary.

The ringing current is furnished by a motor-generator set consisting of a motor direct connected to four a. c. ringing generators. These give the four frequencies for harmonic ringing. The fields of these generators are normally unexcited. The ringing relay of the connector has a special relay, *M*, cut in series with it. This relay *M* controls the field current for the generator giving the particular frequency which this connector uses. Thus, when the ringing relay is energized, the relay *M* simultaneously excites the field of the generator.

The private magnet is peculiar in that the second upper

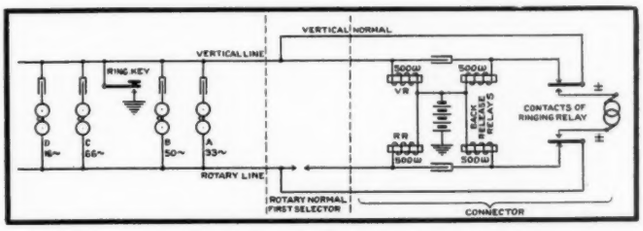


Fig. 115. Condition While a Reverting Call Is Being Made.

tooth is cut off, leaving only one. The effect of this change will appear in the discussion of operation which follows.

If a station on a party line calls some one on another line, the operation of both first selector and connector is essentially the same as any bridging system. But if it be a reverting call, coming back to a station on its own line, the action is as follows: The description must make free use of both Figs. 113 and 114, and in the rapid changes from one to the other the reader will be obliged to follow the diagrams with care.

When the first digit has been pulled, the off normal switch in the first selector, Fig. 113, is closed, giving a connection through that switch over the vertical and rotary lines, with the vertical and rotary relays bridged across, negative battery being tapped on at the center.

On pulling the second digit the vertical relay in the connector, Fig. 114, operates the vertical magnet through side-switch 4, stepping the wiper shaft up. The following ground on the rotary line energizes the rotary relay, which pulls up the private magnet. On falling back, the private magnet lets the end of the side-switch lever, *S*, slip to the second lower notch, thereby moving all the side-switch members to their second positions. At 1 and 2 this does nothing. At 3 the private wiper is connected to contact *C* of the rotary relay. At 4 the control of the vertical relay is switched to the rotary magnet.

The last digit pulled sends a series of impulses on the vertical line, operating the vertical relay, which in turn operates the rotary magnet through side-switch 4. This rotates the wipers to the called line, which in this case is the same as the calling. At the end of the series of impulses on the vertical and before the impulse on the rotary, the wipers of the connector, Fig. 114, are resting on the normal wires of the first selector, Fig. 113. The vertical wiper is on the vertical normal, rotary wiper on the rotary normal, and private wiper on private normal.

Now, when the last impulse comes in on the rotary line, the rotary relays in both first selector and connector will be pulled up simultaneously. In the first selector, Fig. 113, the rotary relay will energize the private magnet and the private normal switching relay at once. The latter switches the private normal from ground at side-switch 3 to negative battery through the bridge cut-off relay. In the connector, Fig. 114, the rotary relay closes contacts *B* and *C*. Contact *C* connects the release magnet to the private wiper to test the private wiper, but since the private normal switching relay of the first selector has removed ground from it, nothing will happen. Contact *B* will cause the private magnet in the connector, Fig. 114, to pull up. Since the second upper tooth has been cut away, the side-switch will immediately snap into its third position.

At 1 and 2 the line will be connected through. At 3 the private wiper is grounded. This causes current to flow from ground through side-switch 3, private wiper, over the private normal to the first selector, Fig. 113, through the contacts 13 and 15 of the private normal switching relay, through its 500 ohm winding, through the 1,300 ohm coil

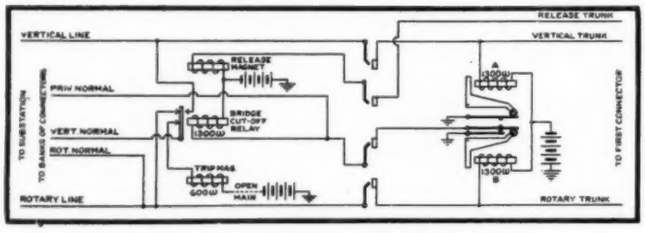


Fig. 116. Grand Rapids Party Line Switch.

of the bridge cut-off relay, to negative battery. Thus the private normal switching relay is locked up, and the bridge cut-off relay pulled up, cutting off the vertical and rotary relays from the line.

At 4, Fig. 114, the vertical relay control is switched to the ringing relay. Now, when the calling subscriber presses his ringing key, he grounds the vertical wire. This pulls up the vertical relay in the connector, energizing the ringing generator, and the former connects ringing current to the vertical and rotary wipers. It flows over the vertical and rotary normals, Fig. 113, in the first selector, to the line where it rings the one of the four bells which is in tune with it. Fig. 115 shows schematically the connections which are important during talking and ringing. The rotary line is broken in the first selector, while the vertical is continued through. But this does not unbalance the line, since the rotary is in connection at the wipers of the connector.

Since there are no relays connected to the line in the first selector it would seem impossible to release. But when the descending hook grounds both vertical and rotary lines, the two back release relays in the connector operate the release magnet, which kicks the wipers back to normal on the pull-up. Hence the connector will be reset while the ground is yet on both wires. The removal of the ground from the private normal lets the bridge cut-off relay in the first selector fall back, reconnecting both vertical and rotary relays in that switch. They immediately pull up, energize their release magnet, and complete the release of the connection.

PARTY LINES AND LINE-SWITCH.

At Grand Rapids, Mich., the party line was required to operate through local battery line-switches. Hence the removal of the ground from the private normal during the reverting busy test had to be performed at the line switch instead of the first selector. This was done by bridging two 1,300 ohm relays across the line as shown in Fig. 116. Relay *B* is the private normal switching relay, but it merely removes the ground while the connector is making the test. The ground is then restored, which pulls up the bridge cut-off relay again so that the vertical normal will be connected to the vertical line. During the act of releasing both *A* and *B* pull up. Relay *A* restores the ground on the bridge cut-off relay which *B* removes, thus preventing the trip magnet from being affected.

(To be continued.)

Servant Would Quit If Telephone Were Taken Out.

A subscriber in our Bath, Maine, Exchange recently ordered out his telephone, but before the removing had been completed he cancelled the order. Upon investigation by Manager Spear it developed that the servant, learning that they were to be without telephone service, promptly gave her notice. This state of affairs so dismayed our subscriber that he cancelled his order for the removal of the instrument. Perhaps this is the solution of the servant girl problem. —New England *Telephone Topics.*

The Relation Between Accountant and Engineer in Construction, Maintenance and Operation.*

By F. G. Simmons,

President of the Electric Railway Engineering Association.

I am much better able to put this matter before you as a talk than I would be were the required vehicle to be known as an address, and I believe many of you will appreciate exactly what I mean. As an engineer in this line of work, and connected, as I am, with one of the large systems of this country, it has been my duty and my pleasure to have many talks with the accountant of the property; and the benefit I have derived from these talks has been and is one of the greatest assets I have been able to acquire during over 20 years in the street and interurban railway field. This statement is the keynote upon which I desire to enlarge in the talk to you today.

It has been too common in the past for an engineer or superintendent in actual charge of construction or maintenance work to look upon the accountant as a person especially appointed to harass and confound him by presenting to him, at certain periods, figures which perchance were not in accord with estimates, either verbal or written, that he had prepared for the management prior to the authorization of the work. All too often the only lesson drawn from this was a feeling of resentment that careful accounting methods had permitted so exact a check.

James Logan, mayor of Worcester, Mass., in an address presented to the graduates of the Worcester Polytechnical Institute and published in the August number of the Journal of Accountancy, in crediting a large amount of the success of that great commercial genius, Andrew Carnegie, to his careful accounting methods, cites the case of a foreman employed by the Carnegie Steel Company who was building a heating furnace and whose costs were being scrutinized carefully, as saying: "There goes that damn bookkeeper, and if I use a dozen more bricks than I did last month he knows it and comes around to ask why." Two lessons directly applicable to my subject may be derived from this. One of these is set forth clearly in the descriptive adjective preceding the noun "bookkeeper." The man evidently felt harassed and worried by the careful methods of the accountant and he voiced his spleen instead of consulting with the accountant and, by taking advantage of the knowledge thus assembled and made available, building up for himself a reputation for ability to which no other one thing can contribute more than can the knowledge of final results as set forth in actual figures.

The other lesson applies to the accountants themselves, who, one and all, should follow the example of the berated bookkeeper and, to as great an extent as they can consistently, should so delve into the methods and work of the other department as to give them the greatest possible insight into the reasons for the results reported and not be dependent altogether on the regular reports forwarded. The accountants may thus be able to nose out mistakes before they have become a matter of actual record. For doing so they should receive the hearty thanks of the engineers responsible for the work, as well as of the executive for whom they are acting. The great danger of inefficiency on the part of the accountant is that in working out his accounts

*Abstract of a talk delivered before the American Street & Interurban Railway Accountants' Association, Atlantic City, N. J., October 25, 1908

according to a regular set of forms and methods he may allow himself to fall into a rut and see nothing beyond the limit of these forms. No one believes more in the good to be derived from the use of a standard set of forms and no one appreciates more the great advantages that have been obtained in that manner through the zealous and painstaking work of the Accountants' Association than myself; but, gentlemen, the accountant himself, the responsible head, should guard carefully against the danger of becoming hemmed in by these forms to such an extent that he can see nothing beyond them. A desire for conferences with the other heads, a carefully fostered curiosity as to the whys and wherefores and a fearless investigation of unusual showings are, in my opinion, broader and deeper qualifications for an accountant than anything else. The working out of forms and the filling in of statistics are more or less automatic matters, and will be taken care of in a regular routine. The accountant should be not only a deducer of results; he should be a student of methods and, when all engineers recognize this and help him to observe in every manner possible we shall be approaching the millennium in this business.

Still further to impress the importance of this broader conception of accounting upon my brothers in the engineering field, and to talk to you but at them, I desire to say that I believe the engineer, whether connected with a large or small property, should see himself that in every case possible an estimate of cost and a plan of procedure is prepared and a copy filed with the accountant for any and every piece of work that may be thus individualized. If this is done and the accountant is worthy the name, he can present to the engineer upon the completion of the work an exact statement of the final results, and a continuous comparison of these results with the original estimates cannot fail to be of the greatest benefit to any engineer no matter how able. I know that to many of you this is but a re-hash of methods long employed, but there are many who have not yet realized that the value of accounting applies in greater measure to future operations than it does to past results, which are unalterable.

In his address as president of your association, some years ago, C. N. Duffy compared the exhibit of the accountant somewhat to the pride taken by a person in exhibiting a house which he has just completed; attention is called first to the general aspects and architectural lines. If the proper interest is manifested attention is then called to more particular features and at last details are discussed. In no case will the visitor be taken into the basement and shown the number of stones in the basement walls, unless for some reason he desires this particular information.

So with the accountant: The broad general facts first; but, if it is desired, he must be in a position to furnish the minutiae of detail, and the engineers are those whom this minutiae of detail can benefit most; therefore I say, gentlemen, that the accountant should keep himself in thorough touch with the engineer and his work and the engineer should co-operate cheerfully and enthusiastically with the accountant in this desire and should, in this manner, keep himself informed as to his costs and the reasons therefor.

The foregoing suggestions, which I have tried to treat in as broad and as general a sense as possible, constitute what we might call the fundamental relations necessary between the accountant and the engineer. A large amount of detail has been worked out in the shape of standard forms and standard methods, which are undoubtedly accomplishing very much toward the outworking of the results which I have mentioned as desirable, but much remains to do, and it has been suggested to me by many persons since the last convention of our associations that it is probably advisable at this time that a joint committee be appointed from the two associations the duty of which it should be to endeavor still further to develop and unify the methods to be employed in accounting for the work of the various engineering branches. The great necessity for this has been impressed upon me by the failure of many of our various committees. In one case these data sheets were sent out to nearly 200 member companies and less than 40 replies were received; of this smaller number of replies many confessed that the data required were not available owing to the fact that the accounting methods of the company did not give them the necessary information.

Now, gentlemen, the information asked was of such importance that for economical and thorough operation of the property the executive staff could not afford not to have it; and yet their methods were such that they apparently did not know facts as to the results they were obtaining that were of vital importance to the successful operation of their property.

Two Telephone Subscribers Given Same Number in New York.

Directory clerks never, never give the same number to more than one person at a time! Here is a story from the New York *World*:

"Gene Robinson, who used to be a circus and theatrical man, and who is now proprietor of McKenzie's Hotel, at Sixth avenue and Forty-third street, is the maddest man in town. There is a telephone in the Hotel McKenzie. The number is 4931 Bryant. Several months ago Mr. Robinson had a 'run-in' with the telephone officials. He went down to No. 15 Cortlandt street to tell them they ought to be in stripes. On his telephone bill for that month there were charges for messages to Northport, Jamaica, Mount Vernon, Timbuctoo, Reykjavik and St. Petersburg, or points equally as good.

"'Wot'ell,' remarked Mr. Robinson to the telephone person. 'I don't know anything about such messages. Never sent one. No one in my house did.'

But the telephone company was obdurate.

"'Pay the bill or give up your telephone,' it said.

"Mr. Robinson paid. The next month there was a repetition of the mix-up. Same old order: Pay or no 'phone. This followed for four or five months, according to Mr. Robinson's version. Then he began sleuthing.

"'Is that M. G. Morrison & Co.?' asked some one over the telephone.

"'What number do you want?' replied Mr. Robinson, evasively.

"'Bryant 4-9-3-1' was the answer.

"'Whom do you want?'

"'M. G. Morrison & Co., of 140 West Forty-second street, who have a news bureau,' was the answer.

"'Well, this the Hotel McKenzie,' replied Mr. Robinson. Then he hustled for the telephone book and looked up Morrison. The book shows that M. G. Morrison & Co. have telephone number 4931 Bryant. It also shows that the McKenzie Hotel has telephone 4931 Bryant.

"'And to think," says Mr. Robinson, 'that I've been paying their bills for six months! I have been told month after month that the telephone numbers were so checked and verified that a mistake was impossible. I have had a dozen people at the offices of the telephone company laugh at my assertions that the bills for messages charged to me were not my bills. I was absolutely helpless until I made the discovery that there was another telephone of the same number.'

"The telephone people say it is the first time in the history of New York that the same number has been given to two subscribers. Mr. Robinson will get a rebate."

Now, if New York had two telephone companies, what would Mr. Robinson have got before he got the rebate?

Central Office Locations*

By S. D. Levings

The method heretofore described for the location of the central office with relation to the initial telephones, or telephonic possibilities, was based on the assumption that all intersecting streets in the town under consideration were laid out at right angles to one another, and that all measurements from the telephone center to the telephones within the territory were made on a rectangular basis. This method will be applicable to the majority of single office towns, as in most cases the intersecting streets are laid out at right angles. However, as some towns, especially the older ones, have many abnormal physical features, such as impassable obstructions, so that it is impossible to lay out streets at right angles, some consideration must be given them, in case it is required to locate the telephone center in such a town. When a town presenting one or both of the two features which will most generally affect the location of the telephone center, either impassable physical obstructions or diagonal streets are encountered, the rectangular method of measuring cannot be used for locating the practical center. In considering the matter of obstructions, but a few conditions will arise to make it impossible to overcome difficulties without resorting to a circuitous route in measuring the distance from the telephone center to the various telephones beyond the obstruction. In most cases where the obstruction presents an aspect of impassability it is due to other than purely physical causes. For example, most towns of fairly large size support a park within their corporate limits, and as a rule the laws governing such parks will not permit of their being crossed by pole or conduit lines. When such a condition is present, all telephones which may be located on the side remote from the telephone center will have to be carried to the central office by other than the rectangular route, unless the extent of the obstruction is small. Not infrequently an obstruction is met with in towns situated on navigable waters, usually in the form of a bay extending up into the territory, which it is impracticable to cross with submarine cables, on account of the cost, etc. In considering physical obstructions, only those which will affect the practical measurements, and cause them to vary from the rectangular plan, should be considered. The difference between obstructions which will affect plant construction and those which will affect the location of the telephone center must be clearly kept in mind. As an example to illustrate what is meant by this statement, consider two parallel streets, one paved and the other unpaved, both from the standpoint of plant construction and that of the effect on the telephone center. If underground conduit is to be built, the unpaved street will, in all probability, be selected as the route for the line, on account of the absence of high repaving charges which would be incurred were the paved street selected. So it may be said that the paved street is an obstruction to plant construction, under the conditions stated. When measuring the distance from the telephone center to telephones along these two streets, either may be chosen without regard for the physical conditions present. It is in this way that all physical obstructions must be considered as affecting the telephone center.

As an example of the type of obstruction which does affect the location of the telephone center, and the general characteristics of such obstructions, consider Fig. 5, which represents a town within which is located an obstruction, park L', the rules governing which make it impossible to cross with the lines needed to supply the subscribers on the farther side. The area of the park is indicated in the diagram. In all cases in which there are present physical obstructions affecting the location of the telephone center, the method pursued is identical and the first thing to be

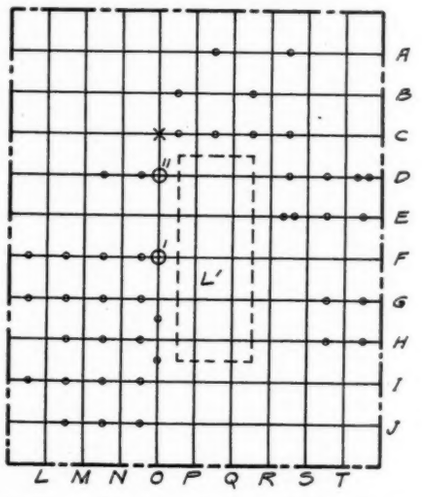


Fig. 5.—Example of Locating Central Office Where Obstruction Prevents Strictly Rectangular Distribution.

done is to locate the telephone center by balancing the telephones, using the rectangular basis of measurement, thus disregarding, at first, the obstruction. When this point, called the theoretical center, has been found, further calculations will indicate the effect the obstruction has on the theoretical location. The advisability of shifting the center will depend on the amount of additional mileage introduced by avoiding the obstruction, together with the number of telephones thus affected. Fig. 5 shows the theoretical center located at O', and the streets over which the rectangular measurements are assumed have been extended through the obstruction L' as indicated by the dash lines. Having worked out a balance, O' becomes the theoretical center, and the vertical and horizontal axes fall upon streets O and E respectively. The balance with O' as the theoretical center is:

North of axis F, 18 telephones.
South of axis F, 18 telephones.
East of axis F, 20 telephones.
West of axis F, 18 telephones.

In obtaining this balance, the telephones lying on the axes have been neglected for reasons previously stated. The next step, in the method to be pursued, is to obtain the influence upon this theoretical center that the obstruction L' exerts.

It is clear that all telephones lying north and east of axis O can best be reached from a given point on O south of C, by a distribution line from such a point on O, north to C, and thence east to the various streets on which the telephones, situated as shown, are located. This being true, it may be said that all telephones situated north and to the east of axis O are considered as being concentrated at the intersection of streets C and O, which point is indicated in the diagram at X. The total number of telephones lying north of axis F and east of axis O, is 20, which, as just stated, are considered as concentrated at X. With this as

*Continued from issue of May 8, 1909.

the assumed condition, the balance becomes as follows, having first assumed a new horizontal axis lying in street *D*.

North of new axis D, 20 telephones.
South of new axis D, 20 telephones.
East of new axis, D, 20 telephones.
West of new axis D, 18 telephones.

A glance at the situation, with *D* as the new horizontal axis, shows that with the change in measurement assumed for the telephones affected by the obstruction *L'*, the original vertical axis, *O*, has not been affected, so it may be considered as the final vertical axis. A further study of the conditions shows that street *D* is the true location for the horizontal axis, since any further change in the location of the horizontal axis will result in a more unbalanced condition than is obtained with the axis at *D*. Therefore, street *D* may be considered the final location for the horizontal axis. As previously stated, the intersection of the axis being the telephone center, the new location for the telephone center is at *O''*. Obstruction *L'* has therefore caused the telephone center to be moved two blocks northward from its theoretical location. From a consideration of the methods just described, it will be apparent that no set of well defined rules can be laid down which will solve all problems which impassable obstructions produce. Many times, even though the calculated centers are obtainable by the methods described, it is logical to shift the location in one direction or another and in such cases special study should be given the situation. From the general results of studies on such conditions as have just been cited, a tentative rule has been deduced, which, while not indicating the method to be followed in overcoming or calculating the difficulty, or obstruction, will indicate whether it is of sufficient importance to be taken into account.

In all cases involving obstructions, the theoretical center should first be located with reference only to the rectanguler means of reaching all telephones within the territory. Having determined the axes, and divided the territory into rectangles, the extent of the obstruction should first be considered before attempting to ascertain its influence upon the telephone center. The tentative rule referred to in the preceding paragraph is:

Where an obstruction is of such an extent as to throw, by other than rectangular routes, a number of telephones to a point on one axis, not on the same side of the other axis where they would fall if measured by the rectangular method, the obstruction will generally affect the location of the telephone center.

To illustrate: Fig. 5 shows four telephones which lie below axis *F*, and would be measured to a point below this axis if the rectangular route were followed. But, on account of the obstruction, they are considered as meeting axis *O* above axis *F*, and such being the case, are considered as lying above axis *F*, balancing the telephones using the practical route of distribution. Therefore obstruction *L'* throws a number of telephones above axis *F* which would naturally fall below it, and conforming to the tentative rule for the effect of an obstruction, this situation is worthy of consideration.

(To be continued.)

Difficulties of "Shooting" Mountain Line Trouble.

The 19th of January promised to be one of those beautiful days which makes Silverton so attractive as a winter resort, so I got the two troublemen out early to go down on the Durango toll line which had a small case of trouble on it, writes R. S. Rankin, for *The Transmitter*, published by the *Colorado Telephone Co.*

This trip is dreaded even in the best of weather, because it is a snowshoe trip from the time you leave the main street of Silverton until you get to Rockwood, a distance of about twenty-eight miles.

One of the boys, Chas. Foreman, was a novice at snowshoeing, so they only made about five miles the first day, and stayed over night in an old log cabin, which had neither doors nor windows in it. It was almost the same as being out of doors altogether. They got no sleep that night, as they were compelled to stand over the fire, which they had built in an old wash boiler inside the cabin to keep warm.

The next morning it had started to snow, and the boys were very much inclined to return to Silverton, but they kept on going in spite of it. As the day grew older the storm became worse, and when night overtook them they were about as nearly "all in" as men ever get.

They had eaten all their grub that morning thinking they would be where they could get more by night (they did not know the country then), but as there is no one living in that part of the country now, and they could not find even an old cabin, as they had the night before, they were compelled to camp under a bridge.

They slept that night, in spite of the fact that they were hungry, wet and cold, and smoke from their fire hung under the bridge so it almost smothered them.

The next morning they called the wire chief at Durango, who told them where they could find an old deserted mine in which they could get protection from the storm, which was getting pretty fierce by this time.

When they reached this mine they found no one at home, but as there was plenty of provisions there, they made themselves at home and did nothing for the next three days but eat, sleep and smoke, as the storm was so bad it was impossible to go out in it.

During this storm every line out of Silverton was knocked out. We were caught by three slides between here and Durango, and by three between here and Ouray. The two-arm lead between here and Eureka was knocked out in two places, and between Eureka and Animas Forks, in one place, and every other line which went into the mountains was damaged more or less.

With my two troublemen tied up on the Durango toll line with enough work to hold them for a week or more, I was handicapped by being compelled to get all green men to help me, and for the next three weeks we "went some."

After it was all over it is hard to describe the pleasures which are found in trying to repair lines in this country under the conditions which exist after a big storm, when the wagon roads are not open and the railroads are trying to shovel out to the top. I will leave this part in your imagination.

We used over 5,000 ft. of twisted pair wire in repairing these troubles, and in most cases had to pack it on our backs.

The two boys who started out to get a small case of trouble were just 16 days in repairing three toll lines.

During the month of February we had just seven days with train service.

Annoyances in Automatic Systems.

By James Mooney,
Chief Switchman, Citizens' Telephone Company, Grand Rapids, Mich.

With the advent of the automatic apparatus into the telephone field comes a feature that at times threatens to assume dangerous proportions, but thus far has caused very little damage. This is no other than the so called annoyances where parties are called and refuse to answer, or perhaps to engage in an offensive line of talk.

Owing to the privacy of the calls, and the quick disconnections, it would seem to the subscriber, and even to the telephone man who is unexperienced in automatic work,

that the opportunities for annoyance without detection are immense. Whether or not this be true the reader can judge from the results gained in some of the larger exchanges where the abuse would be practiced the most. As far as the writer knows, there has never been a case that continued without detection. No matter how shrewd, the annoying parties are eventually found and many of them have faced the courts for their indiscretion.

However, these vigorous steps are taken only when the injured parties so demand, or when the reputation of the service is at stake, as the publicity given out would increase rather than decrease the number of like cases.

The most peculiar feature of the annoyances is that about four-fifths of them suppress themselves without assistance from the telephone company. The reason for this is that the annoying parties are nearly always closely connected in a business or social way, or have confederates near by, and are thus informed of the report to the telephone company. This information places them on their guard, and causes the discontinuation of the practice. It often happens that the annoying party is informed by the unsuspecting one that the telephone company is about to watch the line, and the result is that the case is not again heard from.

The reports must necessarily be dealt with in a very cautious manner, or they may create disagreeable complications that will cause much trouble to the management. Very often they are the result of legal quarrels, or the affairs of prominent persons who are not content to settle the matter in a quiet manner but prefer to enlist the aid of the courts, bring the telephone company into the lime-light as a witness, and incidentally create a wrong impression that every one's conversation is overheard by the employees on the switchboard.

The many cases are cared for by the different methods that the conditions call for. The subscriber when reporting usually gives such information as time of occurrence, suspicions, etc., after which they are instructed how to assist in detecting the annoyer.

With the new improvements in the apparatus, the methods of detection of calls are much simplified. In one of the larger switchboards are circuits so arranged that the fire department calls can be locked at the station until the calling number can be located. Other improvements have made it possible to lock calls from the wire chief's desk. It is only on the older types of switchboards that difficulty is experienced in the detection of calls, and it is invariably due to the lack of knowledge of the proper methods.

The cases of annoyance are usually one of the two types; the quick release, where the party rings and immediately releases, or where they give fictitious messages, engage in abusive language, etc. The latter type is easily detected on any switchboard, as the party remains at the telephone at least the few seconds that is required to trace the calls.

In an exchange equipped with the trunk release wiring, the last switch operated, called the connector, releases all of the switches used to make the connection. By merely blocking the line relay armature on the connector, the call can be locked. This is the least difficult method of detection and can be used only on the equipment mentioned above.

There are yet many of the bridging type switchboards in operation. Calls on these boards are the most difficult to detect because they cannot be locked except by grounding both lines of the connector. This does not always give satisfaction, as the heat coils often allow the switches to release before the call is traced. If the annoyance is of the quick-release type this method usually serves the purpose.

If some of the annoyance cases and the causes that lead up to them could be published they would no doubt make interesting stories; but they would be little different from the petty quarrels that one meets in any walk of life. This is merely a case of the people using the latest inventions to fight their battles.

It would seem, however, that the feature which was once considered a weakness of the automatic, is now no more dangerous than on the manual system.

Dangers of Employment in a Large Organization.

Sound common sense, and the results of especially wide opportunities for observation are contained in the remarks of Mr. D. B. Rushmore, at the banquet of the local section of the American Institute of Electrical Engineers, at Ithaca, N. Y., largely attended by members of the faculty and students at Cornell University. Mr. Rushmore said:

"Engineering is always connected with a project of making money, and therefore any feature of engineering must be judged as much by that as anything else. A man must therefore learn the money value on his own efforts and on any thing with which he is connected. . . . A man is best developed when working for himself. If he is employed by a large corporation he is very apt to become a skilled function in a large organization. He thus becomes only a small part in a very large machine. Splendid opportunities are offered in large companies, but it is a long hard road to work oneself up. . . . The quality of self-reliance is also important. The ability to shift from place to place and to be able to jump into new situations and take the proper grasp of them is very necessary. A man capable of this creates value, and is entirely independent of circumstances, whether they be hard times or not. The great danger in a large organization arises from the temptation to let oneself grow old in a position which does not require continued effort.

"The law of success calls for continued effort. When a man has not got a fight on his hands something must be wrong; and if he finds himself in a position where continual striving is not needed he should get out for his own mental health. . . . It has always seemed wrong to me that the engineer has to sell his labor, so to speak, to the financier. Thus he is always one step away from the income, receiving in salary the income on which he lives. The way for him to make himself independent is to carry investments on the side, such as real estate or other such forms of investment. . . . The young man starting out from college should start in lines where he will be independent. . . . This is judging success in a material way, and although it is not the most highly applicable, yet is is a rule which men use to considerable extent."

As Mr. Rushmore is himself employed by the General Electric Company, one of the largest employers of technically trained men in the world, it is clear that he did not intend to hint that the difficulties are insuperable. But each man should take careful account of his own temperament, as well as consider the progress of others, before entering a large organization.

The keynote of Professor Karapetoff's remarks was "making good all the time." Years ago, he said, a man obtained a position with a large company, stayed with it in a small capacity for many years, until suddenly his loyalty was rewarded by a large salary and often partnership. Thus all his efforts were rewarded at once. Nowadays it is different. A man must make good every day, every hour, meeting each issue as it arises and making good. This condition must hold, said Professor Karapetoff, because our modern form of society demands it. If everybody were willing to plod along expecting to make good ten or fifteen years hence—suddenly—our social relations would be ruined. Modern civilization depends on the continued activity of each individual, who is making good all the time.

Letters on Practical Subjects

Satisfactory Anchoring Under Exceptionally Difficult Conditions.

In the construction of telephone, electric light and street railway pole lines, many conditions arise from time to time that put to a severe test the ingenuity of the man in charge, in obtaining suitable anchorages to take the side strain where curves and sharp angles are caused by the irregular line of the streets, alleys or abutting property, and when it is necessary to cross private property when all attempts to secure the necessary permission to construct a reasonably straight line are failures.

The writer has in mind a line of poles belonging to the Kinloch Telephone Company, of St. Louis, which were erected along Broadway, past Calvary Cemetery, for the purpose of carrying a 50 pair cable and one arm of local wires. These poles are 45 feet in length. The conditions in St. Louis in some localities are peculiar, in that there are two telephone companies, each occupying opposite sides of the streets. The Electric Light Company necessarily uses either one or the other company' poles. For instance, they use the poles of the Kinloch Telephone Company. Along Broadway, in front of Calvary cemetery, is a curve which is sharp and of such radius as to require nine poles to make the curve, each spaced at a distance of about 135 feet. At a point about four feet east of the pole lines are the street railway tracks, the crown of the street being such that the top of the car has a tendency to lean toward the pole. The poles, by reason of the strain caused by the heavy electric light wires, which consist of seven No. 0000 cables, have a sag of approximately 14 ins., and tend to pull the line outward toward the street and interfere with the street car traffic.

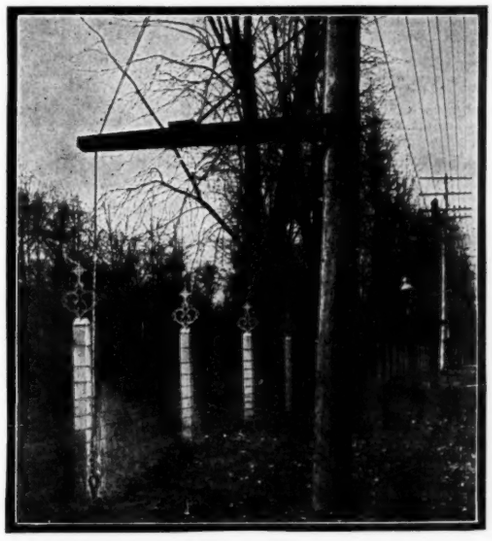
The situation is one wherein it is impossible to erect guy stubs on private property, or to bury "dead men" because of the sentiment existing against the encroachment of any devices upon the property of the cemetery. The problem confronting the writer was to maintain the poles in a perpendicular position, removing the liability of interference with the street railway cars, and not to interfere with pedestrians on the sidewalk, and at the same time, not to encroach upon the property of the cemetery.

Reference to the photograph reproduced herewith shows the solution of the problem. This construction is so arranged as to act similar to bridge truss construction. An eight inch Matthews guy anchor was employed at one end, and, at a point about 15 ft. above the ground, two 10-ft. cross-arms were bolted to the pole. At a point about 5 ft. out from the pole an oak plate was bolted upon the arms. From the oak plate to the pole, reinforcing the strength of the arms, is an iron brace 1½ ins. in diameter, about 5 ft. long. Two ⅜-in. steel strand galvanized guy wires are attached to the guy anchor, carried through the oak plate, and fastened to the pole at the point of maximum strain, immediately under the cross-arms where the seven No. 0000 wires are carried.

Had it been desirable to take care of the upper arms in the top gain, or the cable in the fifth gain, there would have been another steel strand galvanized guy wire attached to the anchor, and carried to the pole at a point just under the cross-arm provided for the telephone cable and wires, to avoid the possibility of "buckling" the pole.

The conditions enumerated above are such that it would have been practically impossible to obtain an efficient anchorage were there no such thing on the market as the Matthews guy anchor, requiring no digging, and the nature of which permits it to be screwed in the solid ground, against which, under the conditions, those installed had to pull in a vertical position. The only other solution of the problem would have been to dig a hole and bury a rod in concrete. The expense of this would, of course, have been very great.

The truss form of construction shown above is criticized by many engineers as not being safe, owing to the strong liability of "buckling" the pole, and also because it is



Special Guying in Close Quarters as Used in St. Louis.

unsightly, but the problems one has to meet under varied conditions are such that it is quite necessary to do things that may be criticized and yet must be employed. In this particular piece of work, great care was used to prevent "buckling." The fact that this line has stood rigid the last three years, under the varying conditions of wind and sleet stresses, is conclusive evidence that the engineering part of the work is satisfactory.

St. Louis, Mo. R. B. Grant.

How to Do Good Soldering.

I was very much interested by Mr. Reeves' comments on soldering, in the April 24 TELEPHONY, and am thereby moved to relate how I have cured my soldering troubles. To begin with, I sincerely sympathize with the man who is compelled to heat his soldering copper in a furnace of some kind. The electric soldering iron is so much more convenient and efficient, when properly handled, that there is no excuse for the use of any other where current can be had at all times. I now use two of them in the shop. One has been in use about 14 months and is still going after having been used an average of two hours per day during that entire period.

I use a soft brick, hollowed out at one end and keep the copper in when hot, and not in use. The brick is just an ordinary soft burned brick, with a hole scooped out of one end, and a block of wood about 2 ins. high fastened by long screws to the other. Holes are drilled slightly smaller than the screws put through them to attach the block. This device enables one to lay the iron on the improvised stand in such a manner that the soldering tip will be embedded in the cavity of the brick. The tip should lie in a bath of molten solder and resin. Ordinary resin-core solder makes the best bath. This keeps it tinned and bright for use. The brick will radiate enough heat to keep the iron from becoming too hot and thereby burning out the winding.

In doing the actual sold ring I do not usually have much trouble if the article to b soldered is clean. One must be

very particular on this point to get a good job. Sandpaper will remove ordinary dirt, and ammonia takes off grease. On ordinary tinned tips and brass articles common resin core solder is what I use, but for copper or iron that does not usually give a good job, so some flux must be used. The best I have ever found is made by pouring ordinary muriatic acid on zinc scraps and allowing it to stand until it ceases to bubble. Another good one is prepared according to the following formula: Glycerin, 2 oz.; alcohol, 2 oz.; chloride of zinc, ½ oz.; mixed. This is not so corrosive as the first, and is, therefore, better adapted to some kinds of work. I always use one or the other of these fluxes on iron or on dirty work. Then, if I wish to get rid of the corrosive effect of the flux I rub the joint with common baking soda after it is soldered. By so doing one can use acid as a flux on any class of work except the most delicate switchboard parts. This soda is good to clean the bench after using acid, or to remove same from the clothes if spilled on them.

Clay Center, Kans. M. C. Wilson,
Supt. Clay Center Tel. Co.

The Telephone in the Courts

Conducted by A. H. McMillan

Gross Earnings Tax on Mutual Company.

Will you kindly advise me as to what answer we should make to the following from our territorial auditor:

"Q. Amount of gross earnings on business originating and terminating in Arizona—"

Ours is a mutual company and has no earnings. Each subscriber is a stockholder and pays a monthly assessment just sufficient to pay operating expenses and depreciation fund.

This is a new question originating on account of a new taxation law passed at the last legislative session.

The answer we advise you to make to the above question is that the company has no earnings. If the territorial auditor is satisfied, you will hear no more of it. If he is not satisfied, the question of the sufficiency of your answer will be raised, and you can take it up as seems best.

The Editor is inclined to think that the total amount of assessments paid by your subscribers as stockholders would be held to be your gross earnings. Such tax laws distinguish between gross earnings, which are the total amount earned by the company without any deductions for expenses or expenditures, and net earnings, which are the amount of profit earned by the company less all expenses. To hold that because your company called the compensation paid by the subscribers a monthly assessment, and because it makes its subscribers stockholders, you had no earnings, would allow an evasion of the tax, which we do not think the courts would permit. The question is not only new in your territory, but also in the United States, as we do not know of any similar question having been raised elsewhere. We should be glad to be kept advised of the outcome.

Use of Telephone Implies a Contract to Pay for it.

Will you give me information in answer to the following questions:

A subscriber has a telephone in his house, and moves, notifying the telephone company of that fact, and giving it to understand that his brother, who is moving in, wants the telephone. His brother used the telephone for long distance and local work until it was taken out for non-payment. He now claims, in reply to our suit, that he never contracted for the service. Is the fact that he used it sufficient evidence for collection?

The use by the brother of your former subscriber of the telephone in his house implies an agreement on his part to pay for it. He certainly could not have supposed that he was getting the use of it for nothing.

Excluding Lines from a Single Block of a Single Street.

The village of Jonesville, Mich., filed a bill to restrain the Southern Michigan Telephone Company from setting a line of poles upon one block of the main thoroughfare of the village. The act under which the village was organized gave the common council power "to prevent the encumbering of streets, sidewalks, cross walks, lanes, alleys, bridges, or other public places in any manner whatever." The company was building its line through the village without undertaking to secure any ordinance from the council. The village officers, without any authority from the municipality, protested against the company erecting its poles and lines upon one block of the main street. The officers' protest not being heeded, they called out the fire department, hose was attached to a hydrant, and the workmen employed by the telephone company were driven from their work by means of a stream of water, to the huge delight of bystanders.

Subsequently, the village council passed a resolution providing that "no poles of any description shall be set in the streets of the village of Jonesville, nor any excavations made therefor, except under the direction of the council of said village." The street committee of the council was given authority to permit the erection of poles at places selected by them, but not in the block in dispute.

The Supreme Court held that the power of the municipality to determine the location and manner of erection of poles and wires authorized it to wholly exclude the company's poles and wires from a single block of a single street. The village contended that any other holding would permit its main business block to be encumbered with poles and wires which would not only render it unsightly, but would appreciably increase the risk of fire by making it more difficult for the fire department to put up ladders to reach a conflagration. The mere fact that the route designated by the village was less convenient and involved a greater expense to the company was held to be immaterial so long as the company was not prevented from reaching its subscribers. The contentions of the village were therefore sustained and the injunction granted. Village of Jonesville vs. Southern Michigan Telephone Company, 118 N. W., 736.

Refusal of Directory Advertisement calling "Malt Tonic" a Soft Drink.

Because its patrons objected to the advertisement of "Gold Foam Malt Tonic" as a temperance drink when it was not, the Home Telephone Company of Seattle, Wash., alleges that it refused to insert the advertisement as it was improper and not suitable for a home telephone directory.

Thus the company explains its refusal to print the advertisement which Jim McKee of Butte had secured, and it alleges that he suffered no injury by the exclusion of the advertisement while the company would have been injured by putting it in.

The company contends that it was not just ground for a complaint and that Mr. McKee should pay the $500 he is alleged to owe the telephone company for space in the directory.

Practical Questions and Answers

Dry Cells and Coils.

1. At what test would you consider a dry cell useless for telephone use?
2. What resistance induction coil would you use with a high resistance transmitter?

1. Using the Warner battery gage, if a dry cell tests 35 on the scale when new, it is good policy to discard it when it falls below 15. Voltage alone gives no guide. If the voltage of a cell falls below .75 volt while furnishing current to its transmitter in the telephone with the normal number of cells connected, it should be discarded. But different transmitters will give varying results on the same battery.

2. The exact resistance of the primary must be determined by trial. It is the number of turns to magnetize the core that we want; the resistance is merely incidental. Nevertheless it should be kept as low as possible, and still get enough turns. Use not less than 300 turns and let the resistance be between 3 and 6 ohms. Some use as high as 9 ohms and get good results. Let the secondary be about 20 to 30 ohms.

Tone Test for Picking Up Cable Pairs.

Will you please publish in your issue of May 1 a circuit of a tone test to use to pick up pairs in a cable or shorts and opens in a telephone.

Fig. 1 gives two circuits which are used for producing the tone used in picking out pairs in a cable. In circuit *A* the

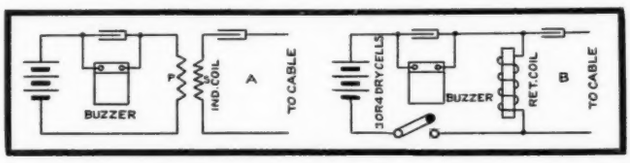


Fig. 1.

induction coil is used while in *B* a retardation coil takes its place, the buzzer being in both cases the interrupter.

Trouble Ringing Rural Line.

Will you please explain the trouble on a farmers' line with 16 telephones on it, 13 Kellogg's, 2 Chicago Supply's and 1 Stromberg-Carlson, all wound to 1,600 ohms. The lines are No. 12 iron wire and run on cross arms about half a mile and then on their own poles below a toll line with six wires on full metallic for two miles. Then the line leaves in all directions. Some days we can ring them good and other times not at all. It rings very hard all the time. We have a Chicago Telephone Supply switchboard with a 6-bar generator and an Illinois power generator with 60 dry cells to ring with. Why is it we can not ring them with the power? They can ring the drop well at the board. We have no trouble ringing 15 other lines loaded just as heavily, but carrying different makes of telephones. We have some trouble on one line with 16 Stromberg telephones. They are all grounded lines, only one wire.

Any of the above makes of telephones will work with the best of satisfaction 16 on the line if you have a clear line, proper joints, and suitable ringing power. The fact that the trouble is intermittent should lead you to look for swinging leaks to earth on the line. If the leak is near the telephones, they may be able to ring "Central" and yet you may not be able to ring them. You may have to increase your ringing battery to 65 or 70 cells and see to it that they are strong enough to do the work. Clean all the lightning arresters on the line, for your leak may be in them.

Cord for Plugging Up Lines in Trouble.

Can you give me a circuit for plugging up a line which is in trouble, by which the operator can learn by testing in the usual manner that the line is in trouble. I want something that will extinguish the line lamp in case of a permanent signal. Our circuit is the regular Dean common battery. We have the apparatus for a tone test which we use in testing cable, but have trouble putting it on the board, as it makes the whole system noisy.

The circuit of Fig. 2 will give the required tone on the defective line and will not tend to make noise on other circuits, as the tone coil is connected across the line in the office like a telephone. Make or buy a special tone coil with about 200 ohms secondary, with a tap out at the center, so that there will be 100 ohms on either side. Connect this

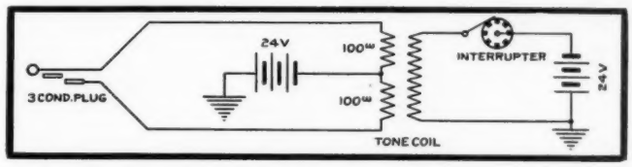


Fig. 2.

tap to negative or undergrounded battery. Wire the outside ends to the tip and sleeve of a three conductor plug. The regular Dean plug is two-wire, with a sleeve long enough to short circuit the ring and sleeve of the line jack. The regular two-wire plug can be used, but if you attempt to plug up on a line whose ring side is dead grounded outside, the cut off relay will be short-circuited and not pull up. The lower half of the tone coil will feed negative battery through the sleeve of the 3-conductor plug to the cut-off relay and hold it up independent of line conditions.

Monitor for Ground Return Line.

I wish to cut in a "listen in" receiver at my residence some 300 yards from the telephone office so as to be able to listen in on the operator's circuit without being detected. We have a small exchange (160 telephones) grounded system.

The circuit shown in Fig. 3 will do the work, provided the relay is properly adjusted. To listen in, close the switch, thereby allowing battery current to flow from the battery at "Central" through the relay, 1,000 ohms, over the line to your residence, through the receiver and switch to ground and so back to battery. The relay pulls up, closing the contact and connecting the special third winding, *S'*, on the operator's induction coil to your line. Condenser C_2 is necessary to prevent the relay from locking up. Condenser C_1 keeps the relay from pulling up through the drop Condenser C_3 does the same thing at the telephone. There is one trouble which you may have, due to the ringing current. When the operator rings out on your line, it may pull the relay up enough to make the contact touch, and if it does, the operator will get part of the ringing current in her ear, by way of the third winding. By making the re-

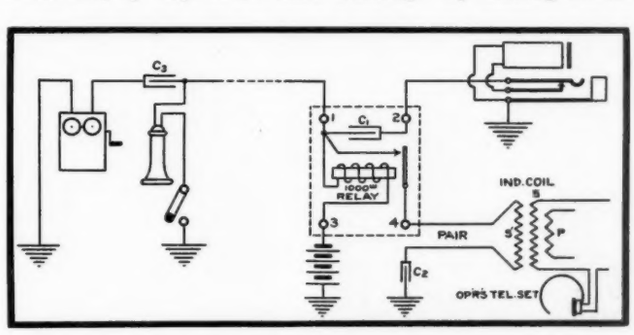


Fig. 3.

lay 1,000 ohms and the telephone bell 80 ohms, series, the latter will take most of the current, since your line is short. You may need to make C_3 a 4 M. F. condenser.

If you put your telephone on a metallic circuit, you can connect this circuit on one side of your metallic and get rid of this danger.

Telephone News

INDEPENDENT TELEPHONE CONVENTIONS

Missouri, Kansas City, May 19, 20; West Virginia, Parkersburg, May 27, 28; Mississippi, Jackson, June 11, 12.

Clearing House Managers Have Perfected Organization to Standardize Methods.

The work of the Independent Toll Clearing Houses is so valuable that the recent meeting of their managers to perfect an organization for standardization of methods is a step in a movement of far-reaching importance.

This meeting was held in the offices of the Eastern Traffic Association, 135 South Second street, Philadelphia, on the 12th, 13th and 14th of April. Mr. H. E. Bradley, secretary of the Eastern Traffic Association, was elected president, and presided over the meeting. Mr. R. E. Mattison, secretary of the Nebraska Independent Telephone Association, of Lincoln, was elected secretary-treasurer.

On account of the number of State Clearing Houses now in existence, several of which are handling an extensive interchange business, and the prospect of several other states organizing clearing houses in the near future, it was decided at the first preliminary meeting in Chicago, last December, that it would be necessary to form a national organization in order that systems might be more uniform, so as to facilitate monthly settlements of one state with another. At this last meeting the ground was covered very thoroughly, taking the work from the ticket all through to the final settlement, which included routing, manner of numbering circuits for convenience of showing routing in tariff and route books, rates, tariff sheets, commission, mileage, check errors, etc. At the present time, each state now organized has a system of its own, built up to meet existing conditions, contracts, etc., which was necessary in order to get the proposition started. Recommendations were made which it will be impossible to put into effect immediately, but the managers hope within the next two years to find all clearing houses using practically the same system. In some states long distance companies, give commissions on originating business,—that is, business which is actually originated by a company—regardless of whether the charges are paid at the originating or terminating office. Other states term "originating business" the business that is actually collected for, giving commission, distributing mileage, etc., upon the actual cash basis, the argument being that the companies making the collections are entitled to the commission. The adoption of the latter system was one of the recommendations—and one that all hoped to see put into effect, inasmuch as it means a reduction of 50 per cent in labor, also time in making the audit, due to the fact that the accounting department is able to begin work upon reports immediately upon their receipt, while in the other case, it is necessary for the reports to be in the hands of auditor, for a check of the sent reverse with the received reverse of other reports, before giving commission, distributing mileage, etc., on the claimed sent reversed business, as no distribution can be made except on acknowledged cash receipts. The only source from which one might expect an objection to this change would be offices originating business for stock yards and wholesale houses, wherein it is a custom to reverse the charges upon the latter.

Another important recommendation was the elimination of a maximum, or fixed amount of commission to be paid on any one message. At present the states are somewhat divided on the question, some allowing 25 per cent on originating business, not to exceed 12½ cents on any one message, others fixing the maximum at 15 cents, and one or two giving commission of 12½ cents on both sent and received, with no fixed charge, all of which makes it impossible for one state to settle with another on an equal basis. It was decided by the convention that a straight commission of 25 per cent be paid on cash receipts, and that the offices be encouraged in originating long haul messages, on account of their receiving their full commission, instead of the present condition wherein the long haul business is not encouraged, due to the fixed commission of 12½ or 15 cents, which doesn't cover the expense and probable loss on messages of a dollar and over. By having a straight commission on cash receipts, eliminating the necessity of picking out the 12½ or 15 cent messages, the work of making audits is also reduced. All clearing houses will conform as near as possible as to the use of report blanks, tariff sheets, etc., as was recommended by the convention, and it is the intention of the managers to adopt a uniform tariff and route book at its next meeting, which will be held in Chicago at the time of the next annual International Telephone Association meeting.

An executive board was appointed to serve for the ensuing year, consisting of the following: H. E. Bradley, Philadelphia; R. E. Mattison, Lincoln, Neb.; W. J. Thill, Des Moines, Iowa; W. S. Vivian, Grand Rapids, Mich.; J. W. Coffey, Indianapolis.

The name of the association is "The National Independent Telephone Commission of America."

International Association Active in Chicago Telephone Complications.

Subsequent to the annual convention last December, when the subject of connection with Independent telephones in a territory within a radius of 500 miles of Chicago received considerable attention, the City Council voted an eight months extension of the telephone franchise of the Illinois Tunnel Company. At this time a proposition arose to amend the ordinance so that it would not prohibit the Tunnel company from selling out to the Chicago Telephone Company, but upon representations by Mr. Critchfield and others speaking for the International Association, the prohibition of such a sale continued. Last Saturday, May 8, there was a hearing before a sub-committee of the City Council on a proposition relating to the possible introduction of an ordinance which would permit the Tunnel company to sell its telephone franchise and property to the Chicago (Bell) Telephone Company.

At this hearing the International Independent Telephone Association was represented by Messrs. H. D. Critchfield, A. C. Davis and Joseph B. Ware. There were also present Mr. B. E. Sunny, president, and Mr. A. S. Hibbard, general manager of the Chicago Telephone Company. No representative of the Illinois Tunnel Company took part in the proceedings.

Alderman Sitts, chairman of the sub-committee, called upon a representative of the Independent interests to state any reasons why such a sale as had been mentioned would not be advisable.

Mr. Critchfield, General Counsel of the Association, exhibited a map prepared by the Association, showing the number

of telephones in each state coming within a circle having a 500 mile radius and its center at Chicago, and based his argument wholly upon the figures of the recent preliminary report of the U. S. Census Bureau. This shows conclusively that there are more than 1,300,000 Independent telephones within 500 miles of Chicago which are absolutely unable to obtain connection with that city. Mr. Critchfield dwelt upon the probability that a very considerable number of these telephone users are sending to Kansas City, Cincinnati, Louisville, Cleveland and Pittsburg business which would normally come to Chicago if they could reach that city promptly over Independent lines.

Mr. Critchfield, in his argument, dwelt upon the absence of representatives of the Illinois Tunnel Company, who may be assumed to be the principal parties interested in the sale. He referred to the position of the Chicago Telephone Company as not representing itself as being in a position to gain by the sale, and he showed how the City would lose revenue which the Tunnel company is obliged by its franchise to pay to the City, should the sale be made, while its business would lose the prospective advantage of connection with Independent telephone users.

He stated that if the council would announce its willingness to sanction such a sale, he would present assurances from responsible parties that they would organize a company of adequate resources, to take over the telephone portion of the franchise of the Illinois Tunnel Company, lease space in the tunnels, and equip and operate a system of not over 20,000 telephones in the business center of Chicago, which should be a terminus for the Independent long distance lines reaching the 1,346,640 exclusively Independent telephones shown by the census report to be within 500 miles of Chicago.

Mr. Sunny, speaking for the Chicago Telephone Company, endeavored to belittle the importance of connection with the Independent telephones. Mr. Critchfield, in his argument, had stated his belief that most of the telephones with which the Bell company claims connection, in its reports to the Census Department, are on rural lines. This was not denied by the representatives of the Chicago Telephone Company, but Mr. Hibbard ventured the assertion that most of the exclusively Independent telephones were of the same class.

Mr. Sunny rested his principal argument upon a letter he had previously written Alderman Pringle. The skeleton of his discussion was that 83 per cent of the Bell messages originating in Chicago terminate within the state of Illinois. Only 2 per cent of the messages originating in Chicago terminate more than 75 miles away. The Bell telephone company has a central office or pay station in practically every town where there are Independent telephones. Therefore, hardly anybody in these towns from one to five hundred miles away wants to talk to Chicago, but if he did want to he could do it from a Bell telephone at present.

Mr. Critchfield called attention to the fact that this argument is directly contrary to much of the published advertising matter of the Bell companies, which dwells upon the strength of the Bell system arising from the claimed "universality" of its service.

He showed that the Independent telephone users do telephone to Kansas City, Cleveland, Pittsburg, etc., and left open the inference that if they could they would talk to Chicago over the Independent lines, which are all they have on their premises.

The Chicago newspapers, it is worthy of note, devoted a large amount of space to this hearing, and set forth the claims of the Independents very fairly. From this it is clear that interest in the matter is not falling off in Chicago, and that a demonstration of the actual need for such connection as is advocated so strongly and ably by the International Association would arouse hundreds of Chicago business men to a point where they would actually demand it. If the Independent companies outside of the city would realize this, and urge local business men who actually would like connection with Chicago, to make proper representations to their Chicago correspondents, and to the Chicago newspapers, it would be a great help to the Association in the work which it has been so vigorously prosecuting.

Following is the compilation from the Government telephone census report for 1907, made by J. B. Ware, active secretary of the International Association, which shows telephone conditions within 500 miles of Chicago:

States Entire:	Independent	of which Bell claim connection with	Exclusively Independent
Illinois	285,322	109,101	176,221
Michigan	106,049	30,933	75,116
Indiana	216,990	50,065	166,025
Ohio	312,278	29,284	283,994
Kentucky	51,796	9,039	42,757
Missouri	220,823	82,393	138,430
Tennessee	25,758	9,241	16,517
Iowa	279,773	74,806	204,967
West Virginia	46,609	15,535	31,074
Wisconsin	89,005	36,366	52,639
	1,634,402	446,763	1,187,640
Fractional:			
Minnesota	90,000	35,000	55,000
Nebraska	30,000	5,000	25,000
Kansas	40,000	15,000	25,000
Pennsylvania	40,000	6,000	34,000
New York	24,000	4,000	20,000
	1,858,403	511,763	1,346,640

INDEPENDENT TELEPHONES
Within 300 mile Radius of Chicago per Government Report Census 1907.

	Independent	of which Bell claim connection with	Exclusively Independent
Illinois	285,322	109,101	176,221
Michigan	106,049	30,933	75,116
Indiana	216,990	50,065	166,925
Ohio (½)	156,000	15,000	141,000
Iowa (½)	135,000	35,000	100,000
Missouri (fr.)	40,000	10,000	30,000
Kentucky (fr.)	15,000	2,000	13,000
Wisconsin (fr.)	80,000	33,000	47,000
Minnesota (fr.)	9,000	4,000	5,000
	1,043,361	289,099	754,262

Thus, according to the Government Census, after deducting therefrom all connections claimed by the Bell telephone company, the correctness of which we do not admit, there remains within five hundred (500) miles of Chicago over 1,300,000 telephones in daily use and having no access to this metropolis; while within three hundred (300) miles are over three-quarters of a million of such telephones in service, likewise exclusively Independent.

Canadian Independents Can Place Telephones in All Railway Stations.

An important general order was made by the Canadian Railway Commission on May 6 giving Independent telephone companies rights to all railway stations. It was ruled that in spite of any agreement for the exclusive use of a railway station between the Bell telephone company and a railway, any Independent telephone company shall have the right to have an instrument placed in any railway station. The order was given in the Sherbrooke case and has now been made general.

Changes in U. S. Telephone Directorate.

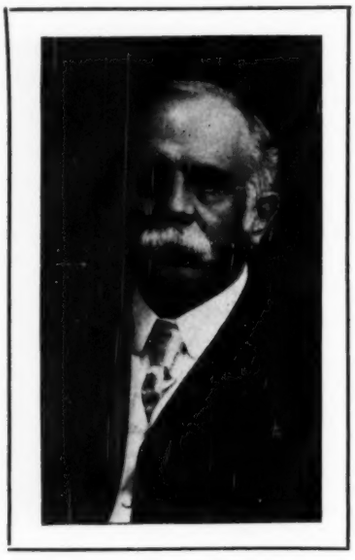
In accordance with the action taken at the recent annual convention of the Ohio Independent Telephone Association at Columbus, O., H. B. Taylor and W. L. Carey resigned from the board of directors of the United States Telephone Company, the corporation which controls the Independent long distance telephone lines in Ohio, and D. J. Cable of Lima and Frank A. Davis of Columbus, were elected in their places. At the recent meeting of the Association Messrs. Cable and Davis were selected by the Association to represent it on the board of directors of the United States company.

Future Independence of Kellogg Switchboard & Supply Company Assured.

The following communication is self-explanatory:

"To the Editors of TELEPHONY:

"It seems to be appropriate for me, at the present time, to state for publication what is the position of the Kellogg Switchboard and Supply Company with reference to the telephone situation. I will state that the company is entirely freed from the hold of the Bell company, and it will remain so, and will be henceforth operated and managed in good faith as an Independent telephone manufacturing company. I make this statement as the owner of over two-thirds of the capital stock of the company.



Mr. Milo G. Kellogg.

"Details as to who are the present board of directors and the officers of the company have been furnished you—I will therefore not repeat this information.

"In conclusion, I desire to express my appreciation of the work of F. W. Dunbar, Kempster B. Miller and George C. Burlingame as complainants in the litigation which brought about or made possible the above result."

(Signed) Milo G. Kellogg.

Fourth Missouri District Meeting.

The second annual meeting of the Fourth District Missouri Independent Telephone Association, was held at Hannibal, April 27.

The meeting was called to order by Hon. J. F. Davidson of Hannibal, who acted as president in the absence of Mr. C. O. Raine.

Following is the program:

"Depreciation; Do We Realize What It Actually Is?" C. A. Brunson, Palmyra.

"Service and Its Requirements," A. E. Marmaduke, Hannibal.

"Cost of Farm Service," Harry E. Couch, Center.

"Collecting; Its Successes and Failures," D. S. Thomas, Paris.

"Is It Profitable for a Small Exchange to Own Its Farm Lines?" C. O. Raine, Canton.

"Seeing Ourselves as Others See Us," W. H. Elliott, Monroe City.

"The Obligation We Should Have for the State Association," W. R. Barkdull, Windsor.

"Is the Mutual Plan on a Permanent Basis?" F. S. Calwell, New London.

"Is It Extravagant to Use Standard Equipment?" H. G. Rodman, Kahoka.

"Why Should Independent Men Use Independent Apparatus?" H. L. Gary, Macon.

"Importance of Toll Lines," J. A. Wheeler, Hunnewell.

"Benefits of District Meetings," A. C. Miller, Frankford.

"From the Subscriber's Viewpoint," T. S. Scott, Philadelphia.

"Why Bookkeeping is So Important in the Telephone Business," A. F. Bennett, Macon.

Effective Advertising of the Benefits of Competition.

Mr. Theodore Thorward, president of the South Bend Home Telephone Company, is one of the most aggressive and successful Independent telephone men in Indiana. His competitors have recently been particularly active in making promises to the people of South Bend, and it became necessary to show the real motive of this activity, and general character of the competing organization's business methods. The heading of a full page advertisement is reproduced, and following is the matter filling the lower half of the page, each letter having been framed separately to occupy one third of the width of the page:

THE TERRE HAUTE SITUATION.

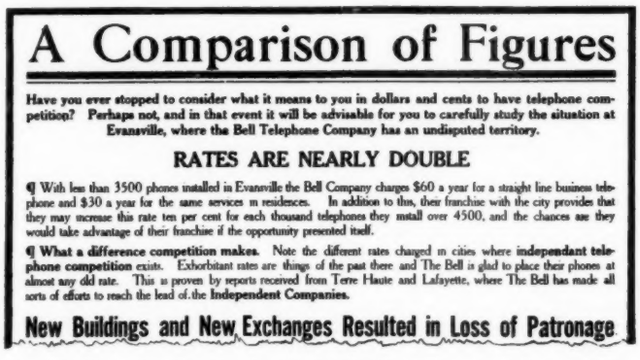
Mr. Theodore Thorward,

President Home Telephone Company, South Bend, Ind.

Dear Sir:

Replying to your favor of the 23rd inst., relative to the telephone condition existing in Terre Haute, beg to advise that the Central Union Telephone Company's new building was erected three years ago this summer and they moved into it about July 1st, 1906. At the time of moving in they had 1600 subscribers. They made a very strong canvass during that Fall, as we were not in a position to meet competition, having not completed our plant at that time. In this manner they increased their list to about 2500 subscribers. We moved into our new building and cut into our new service, October, 1906, at which time we had 2,300 subscribers. We then commenced an active campaign and for six months solicited business, since which time we have done very little soliciting, only seeing those that called into the office and ordered service.

Last November we had 4,000 subscribers, the Bell having 1,875; in other words, they lost in two years about 600 subscribers. Immediately after the Presidential Election last fall the Bell commenced an active campaign and have carried it clear through the winter and have now probably in the neighborhood of about 2,800 subscribers, or an addition of about 1,000 subscribers to what they had last fall. Our list has gradually increased until we have now



A Comparison of Figures

Have you ever stopped to consider what it means to you in dollars and cents to have telephone competition? Perhaps not, and in that event it will be advisable for you to carefully study the situation at Evansville, where the Bell Telephone Company has an undisputed territory.

RATES ARE NEARLY DOUBLE

¶ With less than 3500 phones installed in Evansville the Bell Company charges $60 a year for a straight line business telephone and $30 a year for the same services in residences. In addition to this, their franchise with the city provides that they may increase this rate ten per cent for each thousand telephones they install over 4500, and the chances are they would take advantage of their franchise if the opportunity presented itself.

¶ What a difference competition makes. Note the different rates charged in cities where independant telephone competition exists. Exhorbitant rates are things of the past there and The Bell is glad to place their phones at almost any old rate. This is proven by reports received from Terre Haute and Lafayette, where The Bell has made all sorts of efforts to reach the lead of the Independent Companies.

New Buildings and New Exchanges Resulted in Loss of Patronage

Heading of a Full Page Advertisement in a South Bend Paper.

4,350. In their campaign they have put telephones in for anybody that would accept them on any terms that the people might dictate, ranging from nothing to their regular prices. In many cases people who have become subscribers of theirs, never were known to pay their bills. On the other hand, this, our company, has pursued the same policy throughout this canvass that we have had for

two years previous, and that is if people do not pay their bills promptly their service is discontinued and in many cases telephones removed where payments are not met with reasonable promptness. At the present time, as stated above, the Bell has approximately 2,800 subscribers, while we have 4,350.

Relative to rates, beg to say that the rates have been materially reduced here in the last eight years since the Independent Telephone Company was first started. At the present time the rates extended by both companies are the same, except the direct line business rate of the Bell, which is now $3.50 per month, they having made this cut in rates within the past thirty days, while our charge is $3.00 for straight line service.

It would seem to the writer that it was rather a late day for them to commence talking about the result of their new building here, as that effect has been discounted a long time ago.

Our company is in a very flourishing condition and we expect to reach the 5,000 mark within the city of Terre Haute and West Terre Haute by January 1, 1910, and from the quality of service that the Bell has taken on, I should imagine that there would be a shrinkage in their present numbers of at least 20 per cent by that time.

I believed that I have covered all the questions that you asked in your letter, but if there is any other information you would like to have, I would be glad to extend same. Yours very truly, Citizens Independent Telephone Company, (Signed) By Hart F. Farwell, Secretary and General Manager.

UNREASONABLE RATES AT EVANSVILLE.

Evansville, Ind., March 24, 1909.

Theo. Thorward, Mgr. So. Bend Home Telephone Company, South Bend, Ind.

Dear Sir:—In reply to your queries: The franchise of the Cumberland Telegraph and Telephone Company in this city provides that until the number of lines connected with the exchange in the city shall exceed 4,500, the following maximum rates may be charged:

FOR BUSINESS HOUSES

Direct Single Line	$5.00 per month
Two-party Line	4.50 per month
Four-party Line	3.50 per month

FOR RESIDENCES

Direct Single Line	$2.50 per month
Two-party Line	2.00 per month
Four-party Line	1.50 per month

For each additional 1,000 lines connected with the exchange above the 4,500, an additional maximum charge of 10 per cent on the above rates is permitted.

The Company now has approximately 3,500 lines connected with the exchange. Yours truly, (Signed) J. W. Sappenfield, Deputy City Clerk, Evansville, Ind.

CONDITIONS AT LAFAYETTE.

Lafayette, Ind., Mar. 30, 1909.

Mr. Theodore Thorward, Mgr.,
South Bend Home Tel. Co., South Bend, Ind.

Dear Sir:

In reply to your letter of a short time ago relative to the telephone situation existing in Lafayette, I beg to advise that the Central Union Telephone Company's new building in Lafayette was not erected by the Central Union Telephone Company and they do not own the building. The building was erected about three years ago and the Central Union Telephone Company leased quarters in the same for a period of years. After leasing the above mentioned quarters, the Central Union installed a new common battery switchboard and changed their rental charges from $1.00, $1.50 and $2.00 per month to $1.50, $2.00 and $3.00 per month, and put on a force of solicitors, which resulted in building up their subscribers' list from six hundred to a little over nine hundred.

The following year our company moved into its own building and after installing a new common battery switchboard, etc., and without any solicitors up to February the 1st, 1909, we increased our subscribers' list from 2,700 to 3,587. The Central Union list during this time has decreased and until on Feb. 1st, 1909, was 421 telephones, part of which had been ordered out January the 1st and have not been paying any since that time.

On February the 1st, the Central Union again put to work a force of seven solicitors and up to March the 20th according to their own published lists the seven solicitors have obtained 114 new subscribers by giving a great number of them free service and putting them in without contracts, and some with short time contracts, and upon checking up these lists we find about 25 of them who owe us an old account and 27 of them are duplicate telephones, they having our telephone in their place of business or residence.

During the same period our company without any solicitors have secured 108 new subscribers, all on a twelve months' contract and all having been required to pay the first three months' rental in advance. We concede the fact that the Central Union Company can increase its subscribers' list in Lafayette by giving free service and installing telephones in anyone's house, whether they can afford to pay for it or not.

I forgot to mention above the fact that they reduced their rates on February the 1st to $1.00 for two-party line residence, $1.25 for an individual line residence and $2.25 for an individual line business. These rates of course are only temporarily until they increase their list sufficient to justify them in making a change.

I might further add that the citizens of Lafayette have been loyal to their Home Telephone Company and have thereby saved themselves thousands of dollars yearly in rental which they would have had to pay had the Bell company held monopoly here.

Should you desire any further information, I will be glad to furnish the same, Yours truly,

Lafayette Telephone Company, F. O. Cuppy, Mgr.

The real remedy for discrimination is publicity. If Independent managers would follow Mr. Thorward's example, and spend a little time and money investigating and advertising, the amount of discrimination would be reduced very quickly. The competing company would either have to get remunerative rates at all points, or give away business everywhere—as it chose. There could be no "cut-throat" competition.

Local Capitalists After Independent System at Jacksonville, Fla.

At the regular meeting of the Jacksonville (Fla.) city council, May 4, a proposition which promises to cause some future discussion came up in the nature of a communication from Mr. A. Metzner of that city, stating that he and associates desire to install an automatic telephone system in Jacksonville, and inquiring whether or not it would be possible to secure the necessary franchise.

Nebraska Railway Commission Preparing Uniform Accounting System.

The Railway Commission of Nebraska, since the time of the Independent telephone convention, has given consideration to the preparation of a scheme for accounting in order that a uniform system may be in use by telephone companies throughout the state. It is understood that the plans will give particular attention to the needs of the small

and moderate sized companies, in order that satisfactory results may be obtained for all parties, in the way of providing a set-up which will furnish useful information to the companies and Commission alike, and still not be so complicated as to be burdensome.

New Kind of Theater Advertising.

The accompany advertisement appeared in the Cleveland News, Cleveland, Ohio, a few days ago. The argument is pointed and the inference plain. It might have been a good

DO NOT USE THE BELL TELEPHONE
to call up Keith's Prospect theater. . We have taken out the Bell and use only the Cuyahoga. After three days' notice, the contract department of the Bell Co. could not manage to install a 'phone in Keith's Prospect theater, although the whole operation would not consume 15 minutes' time; and the result was that more than 500 Keith patrons were annoyed and disappointed Monday morning. Many of these patrons may have been taxpayers, who allow the Bell Co. to use the city streets. It is the patrons that suffer and not the theater, for all the calls on the box office 'phones are INCOMING and not OUTGOING.
CALL CUYAHOGA ERIE 101
for tickets for vaudeville at Keith's Prospect.
There will be no Bell telephones at either KEITH'S PROSPECT or KEITH'S HIPPODROME. We will give our patrons good service or none at all.

Recent Theater Advertising in Cleveland, Ohio.

announcement for the Hippodrome and the Cuyahoga Telephone Company, but it surely did not add anything to the laurels of the Bell people. Some people are still wondering what it means, anyway.

Change in New Orleans Telephone Rates.

The telephone committee of the New Orleans Board of Trade has recommended to the Louisiana Railroad Commission certain changes in rates for telephones, which do not, to say the least, work any hardship on the Cumberland Telephone & Telegraph Company, with which the Board is co-operating.

The report states that the Cumberland company has consented to a reduction for measured service (coin collector), individual line, business lines. The old rate was five cents per call, with a monthly guarantee of $6.50, subject to a discount of 50 cents for payment in advance. The new rate recommended is a daily guarantee of 15 cents, with all calls above three charged at 2½ cents each. The monthly guarantee is thus $4.50—or $54 per year for three calls per day. It is proposed to add to the agreement a clause providing for two-party residence service at a monthly guarantee of $2, for 40 calls with additional calls at 2½ cents each. Other rates stand as provided for in last year's agreement.

New Branch Exchange at Columbus.

The Columbus Citizens Telephone Company of Columbus, Ohio, has established in the office of the attorney general of Ohio an automatic private branch exchange system which has some new features. The company's main exchange is only two blocks from the capitol building. The automatic switches for the operation are in the main exchange, and there is a circuit from each telephone to its corresponding switch.

The attorney general's office desired a comprehensive intercommunicating service, as well as connection of all telephones with the trunk line for incoming and outgoing calls, and desired particularly that the intercommunicating and trunk calls might be safeguarded against being overheard by persons at other stations than those which might be directly connected. It was desired that the services of an attendant could be utilized for distributing incoming calls and for making the outgoing calls for the different officers whenever these might expect delay in reaching the desired party, while leaving them free to make their own calls with promptness and secrecy.

The attorney general himself expressed a desire to have access through his telephone to the different other telephones in the system upon occasion, whether or not such other telephones might be in use at the time. All these features are combined in the system as arranged.

Herewith is presented an illustration of an automatic wall telephone, on the shelf of which is mounted a key with forward and backward motions, and a connecting button. This is the attendant's station. The mode of operation is described in a printed card in the following terms:

AUTOMATIC PRIVATE BRANCH EXCHANGE FOR ATTORNEY GENERAL.

All intercommunicating calls are made automatically without reference to the attendant's switchboard. Outgoing calls may be made automatically from any station or made by the attendant and connected through.

For calls through the telephone company's main exchange, prefix 2 to regular automatic number; as 20, Long Distance, 28111, Information Operator.

If busy buzz is heard after calling 2, the trunk line is busy.

Outgoing calls do not use incoming trunk 3294 except, by choice, from the attendant's switchboard telephone.

DIRECTIONS FOR OPERATION OF SWITCHBOARD.

There is a key and a connecting button for the trunk line.

The key has three positions: Upright for normal, pressed forward for 3294 trunk, and backward for local trunk connected with 112.

On incoming calls, press key forward and answer "Attorney General's office."

If a local station is desired, pull back key to local trunk 112 position; call the local number with attendant's telephone dial, and press telephone button to ring.

When local party answers, the trunk and local lines are connected by pressing the connecting button. Before pressing connecting button, attendant can talk to either calling or called party according to position of key, without being heard by the other.

Depressing receiver hook before pressing connecting button releases local connection if key is in the local position. Receiver should be hung up after connecting button is pressed.

Attendant cannot listen in after connecting through.

If attendant is to listen on any call, the called party can get on the trunk by pulling 3 after attendant has notified him and released, whereupon attendant can get on the line by pressing key into 3294 position. If connection is made entirely through attendant's button, then attendant's number (112) will test busy for all calls until released.

When calling party hangs up receiver, the connection is broken throughout.

To test trunk line, press key into local trunk 112 position and call 23294. Pressure on ringing button will ring the incoming bell. Do not press connecting button on this test.

In the absence of attendant, incoming calls can be answered from any station by pulling 3. If the call is for another station, the answering station can release from trunk, call the desired station, and notify the proper person to answer by pulling 3.

To procure outgoing calls, the attendant may be called at number 112 and given directions. The desired party should be called on the 3294 line (without the prefix 2) and when obtained the calling party's station called on local trunk 112 and connection made through with the button.

On an incoming call on line 3294 the calling party after being connected through to a station can get the attendant again by pressing ringing button twice.

Besides the points of operation described in these instructions is the particular application of extra wipers on the switch connected with the attorney general's own telephone. The ordinary intercommunicating numbers are 111, 112, etc., up to 118. If this officer calls any of these numbers and the regular wipers of his switch reach a busy connection, they make contact only with the busy signal. If he wishes line 114, for example, when it is busy, by calling 124 the extra wipers on his switch, which have no private connection, complete their connection with the busy line, leaving him free to interrupt the gossip of an office boy, or to ask a busy subordinate to call him at his first opportunity.

A somewhat similar service has been installed in the offices of the International Harvester Company. In this system there is no local distribution of calls. The names of the different departments are advertised in the directory and in other ways, so that the public or the toll operators may call directly to the particular desk which it is desired to reach. Each of these telephones has a terminal at the toll board, with a visual busy signal.

The Harvester company's officers are heavy toll users, and this arrangement greatly facilitates the long distance business The general agent in charge not only has access from his telephone to the other telephones when they are busy, in the manner described for the attorney general's private branch exchange, but also has a special monitor system by which a visual signal appears when any telephone in the system receives a call, and is restored when the call is answered.

The Columbus Citizens Telephone Company has originated many of the new features of automatic telephony. The officers and employees of the company have made a special study of new features in the field of automatic telephones, and many improvements have been made in that direction. The company has also installed automatic branch exchanges with many new features at the Columbus post office, Ohio State University, Columbus Brass Company and a number of other business houses.

Iowa Legislature Compels Railways to Install Telephone.

The General Assembly of the State of Iowa, at its last session, passed the following:

"Section 1. That section two thousand seventy-seven-a (2077-a) of the supplement to the code 1907 is hereby repealed and the following enacted in lieu thereof: It shall be the duty of all railway companies on all lines of railways operated by them to install a telephone in each passenger or freight depot in any city or town where a telephone exchange is maintained for public service. Said telephone to be connected with and for the use of the patrons of said exchange, and it shall be the further duty of all railway companies on all lines operated by them to keep posted in the waiting room of each passenger station, a bulletin plainly showing the time of arrival and departure at such station of all trains carrying passengers."

It was approved by the governor April 16, thus becoming a law of the state.

Montana Keeping Up Record for Independent Growth.

Managing Director T. S. Lane, of the Montana Independent Telephone Company, has completed a tour of inspection of the telephone development under way by the Montana Independent Telephone Company throughout Montana and Idaho.

TELEPHONY's correspondent at Butte reports that Mr. Lane left recently for Chicago and other eastern points for the purpose of placing orders for telephone equipment, cables, wire and other construction material aggregating $200,000. The equipment and material purchased will be used for additions to the Butte exchange, for the various long distance lines which the company has under construction throughout the state, and for the new exchanges now building at Helena, Mont., and Pocatello, Idaho.

Before leaving Mr. Lane said: "The next four months will be marked by an astonishing growth of the Independent telephone business in Montana and neighboring states. Early in May our new exchange at Deer Lodge will be open for service. The construction of the Helena exchange is well under way, and our new fireproof office building at the corner of Park and Edwards streets will be completed about July 1, 1909, and a complete telephone exchange with at least 1,000 telephones installed and in operation will be open for service in Helena about Aug. 1.

"We are installing new exchanges at Boulder, Three Forks and Basin, which will be opened for service within two weeks.

"Work on the new exchange which we are installing at Pocatello, Idaho, is well under way, and this exchange will be opened for service about Aug. 1, with at least 500 telephones connected.

"The growth of our business in Butte has been beyond our expectations, and we are now crowded for capacity in the northern and southern portions of the city, and have a large number of orders on the waiting list in these sections. This condition is, however, being rapidly remedied by the installation of additional cables, which will give us capacity for several hundred additional telephones in the northern and southern sections of the city.

"Our long distance business to Anaconda, Helena and Boulder is showing a daily increase. We are building extensions from our main lines to Gregson Springs, Silver Bow, Basin, Corbin, Alhambra and Clancy, all of which will have connections with our main long distance system shortly.

"East of Butte we have a large construction camp at Whitehall, which is extending a long distance line from the east to Butte. These connections will be completed about May 15, and we will then have excellent long distance connections with all points east, including Bozeman, Livingston, Billings, Red Lodge and Lewistown."

Mr. Lane further stated that the present season would see the development of the Bitter Root Valley by the Montana Independent Telephone Company. The company has purchased real estate in Missoula, on which will be erected a modern, fireproof central office building during the present season. The city of Missoula recently granted a franchise to the Independent company, and engineers are now making surveys and preparing plans for the Missoula exchange, as well as long distance lines up to the Bitter Root Valley.

The company will install an automatic system in Missoula, similar to the one now in operation in Butte.

A new addition to the switchboard of the Butte exchange has become necessary, owing to the growth of business, and additional equipment has been ordered, which, when installed, will give the Butte exchange an immediate capacity of 4,500 telephones.

The growth of business at Anaconda has also been phenomenal. Nearly one hundred new instruments were installed last month.

A. L. Tetu Resigns Management of the Home Telephone Company of Portland, Oregon.

Mr. A. L. Têtu, for a long time a leading figure in Independent telephone circles, and for some time past the general manager of the Home Telephone Company of Portland, Ore., has recently resigned that position. He has accepted the management of the business of the Realty Associates

which is one of Portland's strongest organizations dealing in real estate.

Mr. Têtu's many friends in the telephone business, while regretting to lose such a genial and able associate, wish him great success in his new venture.

Discussion of Wireless Telephone by Engineers' Club of Central Pennsylvania.

The March number of the Journal of the Engineers' Club of Central Pennsylvania, published at 219 Market street, Harrisburg, contains an interesting paper on wireless telephony and telegraphy, which was read before the club on January 26th, by Mr. H. S. Webb. Mr. Webb describes briefly the history of the development of wireless telegraphy and telephony and present condition of the art. Unfortunately he limits his discussion of the wireless telephone to a single system, which is claimed in many quarters not to represent the highest development of wireless telephony.

Crawfordsville Council Turns Down Commercial Club Franchise.

The Independent company at Crawfordsville, Ind., finds that its troubles due to the harassing tactics of its competitor have not terminated as a result of the elaborate investigation by the Commercial Club. After listening to all the arguments of the unification idea advanced by the Bell interests, the Commercial Club recommended a new franchise for the Independent company, with permission to raise rates. The city council has refused to grant this franchise, although it represented an attempt to safeguard the best interests of the city by its leading business men. The Commercial Club bitterly resents the biased action of the council.

Telephone Patents

Conducted by Max W. Zabel

TELEPHONE JACK-BOX.

J. B. Taylor and W. S. Bralley, Schenectady, N. Y., patent 919,394, April 27, 1909, assigned to General Electric Co.

The telephone jack-box of this patent is for use along railroad right-of-ways, so that a portable telephone carried on a car may be connected with line wires with which the jack-box is associated. The invention contemplates the use of lightning arresters and protective devices in each jack-box, which, however, are not normally connected with the circuit, but are only in the circuit when a telephone is connected with the jack-box. This overcomes the objection, it is claimed of having a multiplicity of protective devices on the line, all of which are liable to get out of order, especially at times when most needed.

CUTOUT AND LIGHTNING ARRESTER.

William E. Ashby, Chariton, Ia., patent 919,519, April 27, 1909,

A lightning arrester with a cutout switch is disclosed in this patent, and has ordinary toothed discharge members for discharging the excess current to ground. The discharge members are also provided with jaw blades, which, in connection with a pivoted arm, serve to connect the telephone either to the line wires or to ground.

INDIVIDUAL PROTECTOR.

Frank B. Cook, Chicago, Ill., patent 919,696, April 27, 1909.

The fuse construction of this patent consists of a heavy circular member of insulating material, having a central bore through which the fuse passes. The fuse wire is crimped so that it touches the insulating material at various points. The fuse itself consists of an inner bore of iron or steel and a shell, drawn entirely over, of copper. Fastenings are provided upon the end of the insulating material to accommodate the fuse wire.

TELEPHONE TRANSMITTER.

Ralph C. Browne, Essex, Mass., patent 920,425, May 4, 1909, assigned to John Abbott, Winchester, Mass.

In this transmitter, the ends of the circuit from the battery, which lead to the transmitter, end in two pins, and the carbon electrodes are suitably actuated by a diaphragm as in the ordinary transmitter. It is claimed that by having the actuating electrodes transversely mounted to the direction of the current flow between the pins, amplification of the sound producing currents results.

TELEPHONE TRANSMITTER.

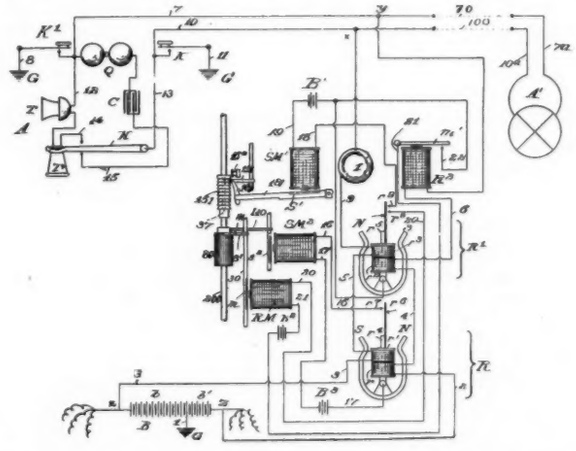
Ralph C. Browne, Essex, Mass., patent 920,424, May 4, 1909, assigned to John Abbott, Trustee, Winchester, Mass.

This transmitter is similar to the one of patent No. 920,425, except that the current is taken off by means of one pin, but the other battery terminal connects to the center of the electrode in the carbon carrying cup.

AUTOMATIC TELEPHONE EXCHANGE SYSTEM.

J. W. Lattig and C. L. Goodrum, Philadelphia, Pa., patent 920,350, May 4, 1909, assigned to the American Automatic Telephone Co., Rochester, N. Y.

This telephone system is designed to provide an arrangement whereby a central battery can be used in connection with automatic telephone exchange apparatus. The illustration here shown sets forth an ordinary Strowger system with the new devices shown in place. The principal features of adapting the Strowger device for common battery work



consist in the use of common polarized magnets r' r^3 and in the neutral relay R^2. The common battery B supplies the current for actuating the vertical and rotary relays of the ordinary Strowger system.

SPLICING CLAMP.

C. E. Cook, Chicago, Ill., patent 919,323, April 27, 1909, assigned to Frank B. Cook, Chicago, Ill.

The principal object of this invention is to provide a tool for twisting wires at joints where either wires are used

alone or with sleeves, and to this end a rotable device having indentations is mounted upon the tool. These indentations each accommodate two wires, and the different indentations are likewise designed to accommodate different sized pairs of wires or connectors.

RECEIVER ATTACHMENT.

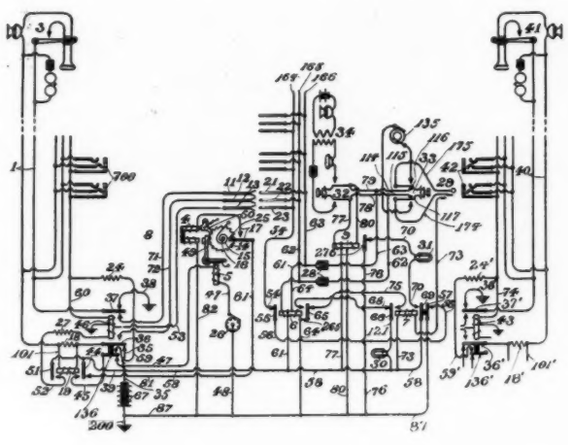
John L. Creveling, New York, N. Y., patent 920,277, May 4, 1909.

The apparatus of this invention consists in an auxiliary ear piece to be used in connection with the ordinary receiver, so that both ears are provided with ear pieces. A tube connects the auxiliary ear piece with the ear piece of the main receiver, so that both ears receive the sound vibrations. Means are likewise provided with the auxiliary ear piece to close the entrance to the tube, if desired.

CALL DISTRIBUTING EXCHANGE SYSTEM.

Sidney B. Browne, Pittsburg, Pa., patent 920,259, May 4, 1909, assigned to A. T. & T. Co., New York, N. Y.

This invention is designed to provide automatic means at the central stations, whereby the subscriber can connect himself with any unbusy cord circuit. The illustration shows an ordinary automatic central station apparatus 8, which, through the interposition of the relays shown, is actuated when the subscriber takes his receiver off the hook,

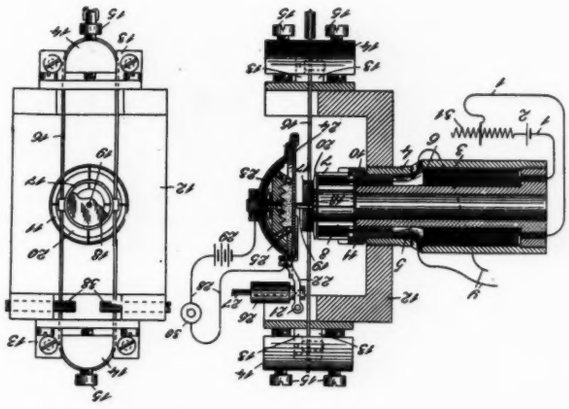


whereby to connect the contacts 11, 12 and 13, with any unbusy cord terminals 21, 22 and 23. The operator before whom the call terminates communicates with the initiating subscriber and completes the connection.

SOUND INTENSIFIER.

Alexander Nikiforoff, Warsaw, Russia, patent 920,624, May 4, 1909.

The repeating or sound intensifying arrangement here shown consists of a pair of annular cores 4, 5, and a coil 3, in connection with a battery 2, serves to polarize them.



The pole pieces, 7, 8, likewise annular in construction, surmount the cores 4 and 5, and are fastened thereto by an annular ring 11. They are constructed in the form of quadrants to reduce eddy currents. The receiving coil is mounted between the cores 7 and 8. An armature 20, likewise in quadrants, is mounted upon a cord 16, which has the shape of an elongated O, and is mounted in the framework 12. The armature 20 is thereby very easily responsive to changes in magnetism, it is claimed, by reason of the fact that it is not so rigidly mounted as a diaphragm in the receiver, and a pin 19 engages a microphone arrangement 23 to retransmit the sound.

TELEPHONE SWITCHBOARD CABLE.

W. L. Runzel, Chicago, Ill., patent 919,384, April 27, 1909, assigned to Runzel-Lenz Mfg. Co., Chicago, Ill.

The cable shown in this patent consists of a plurality of cable units which are mounted within one enclosing sheath. This cable is designed for use back of telephone switchboards. In order to separate the cable units and to maintain the uniform outline of the finished product, separators are inserted and drawn the length of the finished cable, and threads or stitching devices maintain the cable in its uniform position.

In the Manufacturing Field

The New Electrical Laboratory Equipment of the City of Philadelphia.

The city of Philadelphia, in advance of most of the other cities of this country, recently provided an excellently equipped electrical testing laboratory.

A little consideration of the electrical interests of any large city emphasizes the importance of such a laboratory.

The Electrical Bureau has charge of the city hall lighting, and the entire street lighting of the city, which extends east and west about eight miles and north and south, twelve miles.

The extensive fire alarm and police telegraph and telephone system is also under the charge of this Bureau. The central station of this system is in the City Hall. There are centered there some eighteen hundred wires, by means of which the police and fire departments are in communication with all parts of the city.

The excellent condition of all of the electrical work is due to the untiring energy and progressiveness of the Chief of the Electrical Bureau, Mr. James F. McLaughlin, and to him also is due the equipment of the electrical laboratory. The instruments of this laboratory were all furnished by the Leeds & Northrup Company of Philadelphia and include photometric apparatus and other equipment hereafter described.

Ammeter and voltmeter standardization apparatus comprises a complete equipment for the accurate measurement of direct current electromotive forces from a very small fraction of a volt up to 1,500 volts and for the measurement of currents from a milliampere to 300 amperes. Re-

ferring to Fig. 2, the instruments are shown ready for a test. They are the well-known Leeds & Northrup potentiometer, (which itself measures electromotive forces from the lowest up to 15 volts), a volt box or multiplier for extending the range up to 1,500 volts, a set of standard low resistances

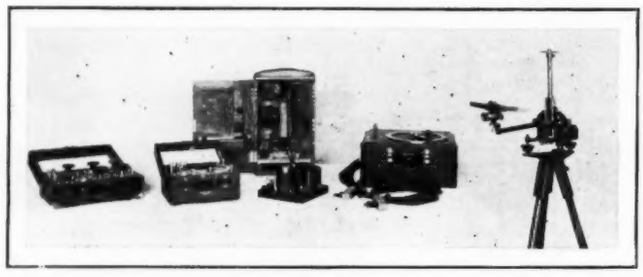


Fig. 1. Portable Cable Testing Apparatus.

for measuring current, a Weston standard cell and a Type H wall D'Arsonval galvanometer.

Laboratory cable testing apparatus is shown to the right in Fig. 3 and contains all of the necessary instruments for measuring the capacity, insulation and conductor resistance of cables. Capacity is measured by the ballistic throw method, and insulation by the direct deflection method as is customary in the laboratories of cable manufacturing plants. The instruments are a high sensibility galvanometer, a lamp and scale, standard 1/10 megohm, standard 1/3 microfarad condenser, Ayrton shunt, Kempe key, battery and galvanometer reversing switches, short circuit key and other keys and switches for interchanging connections. The particular form of galvanometer used has been found very satisfactory for this class of work on account of its quickness of action and accessibility of its parts, combined with its high sensibility. The lamp stand and scale is one meter long and is of the type in which the scale is read by reflection from a mirror. This type is much more satisfactory than that requiring the light to come through a translucent scale, as the spot is equally visible whether the observer be directly behind it or not. It will be noted from the illustration that the grouping and arranging of the instruments provides the best possible insulation and, at the same time,

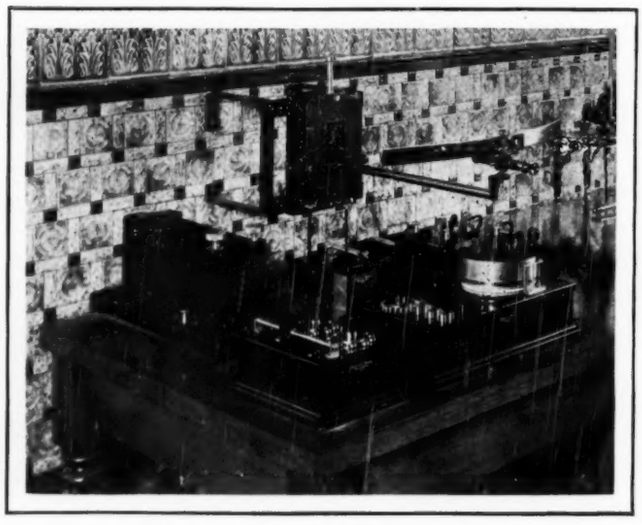


Fig. 2. Testing Instruments of the Philadelphia Electrical Laboratory.

connections that are perfectly obvious. The instruments are all mounted on a polished hard rubber plate. The binding posts and many of the parts of the instruments are mounted on petticoat insulated pillars. Connections between the instruments are made by means of heavy nickel-plated wires, stiff enough to hold their shape and to be run in the air, which insures perfect insulation and a scheme of connections which can be readily traced. The arrangement of switches, etc., is one which has been found most satisfactory from the operator's standpoint. To interchange connections so as to change from capacity to insulation tests, it is only necessary to throw a few double throw switches.

To the right of the insulation and capacity testing set is a five-dial Wheatstone Bridge for resistance measurements from a small fraction of an ohm to a few megohms. The dial construction of this bridge makes it exceedingly convenient to use without any sacrifice of accuracy due to poor contacts. The galvanometer, lamp and scale and Ayrton shunt of the insulation and capacity testing set are so arranged that they may be used with the Wheatstone Bridge.

The above described insulation testing set can be used only for testing cables which can be either brought into the laboratory or connected to it by means of other wires. There are frequently occasions to make tests on cables where this is not possible and an equipment of portable testing apparatus is also provided. The instruments for this

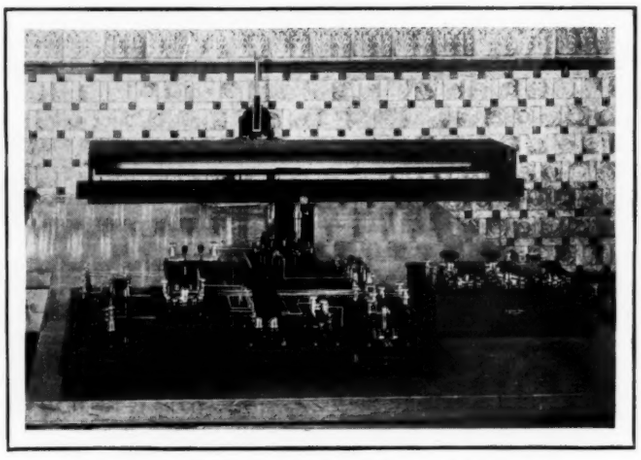


Fig. 3. Laboratory Cable Testing Instruments.

purpose are shown in Fig. 1. Beginning from the left to the right, these are:

1st. An L. & N. Dial Decade Portable Testing Set for measuring conductor resistance and locating faults by means of the Murray and Varley loop tests.

2nd. An L. & N. Fault Finder for making the same measurements. This instrument is particularly adapted for measuring faults in cables where wires are in pairs, as in telephone cables, and is so simply arranged that linemen without technical education can readily learn to do excellent work with it. It is also an excellent instrument for locating opens.

Number 3 is the portable telescope galvanometer—an instrument with which insulation resistance may be tested up to 200 megohms. For its range of measurement, it is a remarkably light and convenient piece of apparatus.

Number 4 is a bridge for locating faults in power cables and other cables of large cross section and it will be noted from the illustration that it is provided with large extension cables and large clamps, by means of which errors due to connecting leads and imperfect contacts are eliminated. On account of the large cross section in the class of cables for which this bridge is intended, it is very important to avoid these errors.

Number 5 is a high sensibility galvanometer, mounted on a tripod for street use. In combination with the 100,000 ohms, Ayrton shunt and standard condenser, which are shown in the carrying case in the back of the picture, this instrument is used for insulation and capacity tests. The

galvanometer is provided with a special device to minimize the influence of vibrations, which is so successful that it is practical to use the instrument even in places where the ground is in continual vibration, due to heavy traffic or other causes.

The Harpoon Guy Anchor.

Although the ease of handling, adaptability to use in restricted locations, and holding power, have always been features of the Harpoon Guy Anchor, which gave it a good reputation among construction men, it has recently been so modified in some details as to be a decided improvement over the anchor introduced under this name in years past. As now manufactured, no twist is made in the long rod, and the anchor is heavier and more substantial. The twist mentioned was made in order to procure two surfaces at right angles to each other through which the rivets, fastening wings to the rod, could be passed, thereby permitting the wings to be set at right angles.

This original feature, although not objectionable, has been superseded by a more practical method of forging, in which the rod is forged with two surfaces at right angles, as shown in the illustration. This provides a better product in mechanical appearance and construction. Other improvements which have been introduced strengthen the rod and rivets. The rod under the present construction is 5 ft. long, and is formed from one inch square special Bessemer steel stock. The head is provided with extra stock and is shaped so as to safely withstand the hardest driving blows. The materials employed in the composition of the various parts are proportioned so as to insure a factor of safety over all possible tensile and shearing strain, and at the same time provide sufficient rigidity to prevent buckling, without approaching a brittle state. The greatest strain to which the rivets are subjected is a shearing one, and they in particular have great shearing resistance.

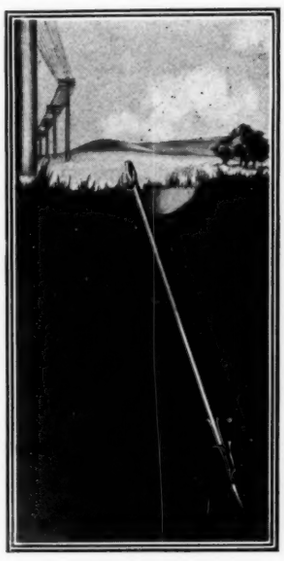
Its great strength is indicated by the design and material employed. The heaviest anchor weighs 23 pounds, and at the same time is as simple as the manufacturers can make it. No tools, such as special wrenches or hole digging appliances, are required. An ordinary maul does the work. It can be installed alongside and directly against a fence, curb, building or any other similar obstructions just as easily as in a cleared space. In installations just mentioned no special appliances, other than those ordinarily used with the anchor, have to be employed. It can be installed in pavements by simply making an opening wide enough to allow the passage of the closed anchor.

It can be installed at an angle and should always be installed at the same angle as that assumed by a guy wire when in the proper position. The proper angle can be easily determined by stretching a hand line from the point of attachment of the guy wire to pole to location of anchor, and then driving parallel to the stretched hand line.

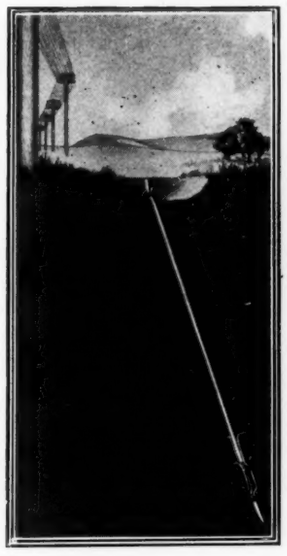
The difficulties encountered through silt and water collecting in a hole are eliminated, as no hole has to be dug for the Harpoon Guy Anchor. In marshy or wet ground the anchor is driven through into solid earth, a simple operation.

It is a good anchor to employ when "stealing" becomes a necessity, as the operation of installation is quick, simple, undestructive and it does not present an unsightly finished job.

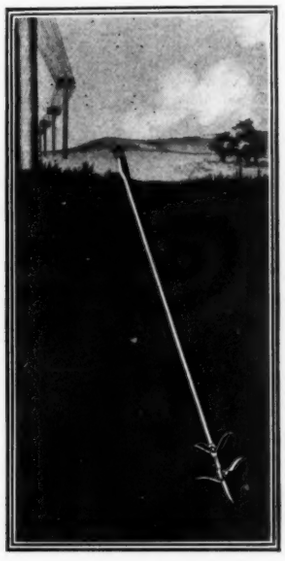
Harpoon Anchor, Partly Driven.



Nearly Down.



Ready to Set.



Blades Expanded.

Its manufacturers, the Crouse-Hinds Company, Syracuse, N. Y., have special information collected from practical men who are constant users of this anchor, which construction men find useful.

Recent Monarch Orders.

The Independent Telephone Company at Judith Gap, Mont., has recently installed a switchboard furnished by the Monarch Telephone Manufacturing Company, of Chicago, and also purchased 30 of the latest type Monarch series telephones, which it is estimated will take care of the present demands.

The Monarch company also recently shipped a switchboard to the Taylor Telephone Company at Taylor, N. Dak., and in another shipment sent 36 of its series telephones to the same place.

The Winchester Telephone Company, of Winchester, Kans., recently ordered a 250-line Monarch board equipped with the bridge and series clearing-out drops with lamp recall. With this system it will be impossible for a ring off from any of the lines in the Winchester exchange to fail to throw the clearing out drop and the recall lamp makes it possible for a subscriber to get the operator's attention immediately, even though she has neglected to restore the shutter.

A one position toll board has been ordered by the Independent Telephone Company at Sabetha, Kans

A Non-Corrosive Liquid Soldering Flux.

For soldering anything but the smallest pieces of metal, there are well-known advantages in the use of a liquid flux. But experience with many soldering fluids which have been prepared in the exchange, or purchased, has usually led to

Cans of a New Soldering Fluid, and Fountain Brush with Which It is Applied.

their rejection, because they are hard to carry, difficult to apply in proper quantity to the exact part of the surface where needed, and, worst of all, leave a residue which corrodes the metal.

An examination of the metallic fountain brush which forms at the same time a convenient vessel for holding, and handy instrument for applying the new flux, "Ruby Fluid," is enough to silence anyone who quotes the first two objections. When the brush is pushed tightly into the tube it forms a close-fitting stopper, so that it can be laid on a bench, or swung at the belt, by the hook shown in the illustration, without danger of leakage. Yet a pull on the bristles extends the brush to provide for a well regulated flow of the liquid, so that it can be lightly spread over just the spots where it will be useful.

The non-corrosive nature of "Ruby Fluid," guaranteed by its manufacturers, the Ruby Chemical Co., 54 North Clark St., Chicago, is apparently well attested by their willingness to furnish a metal tube, with a brass nozzle, for holding a working supply, and to store and ship it in tin cans. This not only means that it will not corrode connections, but that it does away with troublesome "pitting" of the soldering copper.

"Ruby Fluid" is recommended by the manufacturers as a proper flux not only for copper and galvanized iron, but for lead. They claim to be able to demonstrate its economy, and refer to several manufacturers of telephone and electrical apparatus as proof of its reliability. But of course the best test is a trial application in practical work.

THE NATIONAL ELECTRIC WORKS, located at Whittier, Cal., has issued a circular containing illustrations and the advantages of the National incitophone. The incitophone is an instrument designed to simplify the system of signaling the operator when a subscriber wishes to talk. It is claimed that great economy is effected both in wiring, trouble, and space by the use of this system.

DETROIT COPPER & BRASS ROLLING MILLS, Detroit, Mich., has issued a catalog giving prices and other information regarding all the various products of the company. Tables of dimensions and weights are given in the rear of the book. It is of convenient pocket size and is thumb indexed so that the parts desired may be easily found.

THE UTICA DROP FORGE & TOOL COMPANY, of Utica, N. Y., since the first of April, has been selling its products direct to the trade. The company now has one of the largest nipper and plier factories in the country, its plant having been completely rebuilt within the last two years.

Condensed News Reports

Officers of companies are earnestly requested to forward us promptly all financial and other statements as soon as issued and any items of interest as to their plants and systems

NEW COMPANIES.

MARMADUKE, ARK.—The Independent Rural Telephone Company has been incorporated with a capital stock of $2,000. T. R. Corley is president; B. B. Stone, vice-president; G. C. Meredith, secretary, and C. E. Ross, treasurer.

GUNNISON, COLO.—The Gunnison County Co-Operative Telephone Company was recently incorporated with a capital stock of $50,000, by R. H. Andrews, W. A. Gillaspey, William Dalton and others.

MIDDLECREEK, ILL.—The Middlecreek Farmers' Telephone Company has been incorporated by Scott Belknap, William H. Smith and Arch. O. Galloway. It is capitalized at $2,500.

KOKOMO, IND.—The Stahl-Goyer Telephone Company has been incorporated and expects to establish exchanges and telephone lines in Howard county. Geo. A. Stahl, Chas. J. Stahl, Edward Hardebeck, Newton Keyton and Geo. Becker are the directors.

ALBANY, N. Y.—The Public Service Telephone Company has been incorporated with a capital of $10,000,000. The company is organized to build and operate telephone, telegraph and telautograph lines through the various towns and cities of this state and the Dominion of Canada. The directors are Jno. A. L. Campbell, Robert F. Routh, Joseph P. Hauck, Russell H. Robbins, Albert J. Appel, of New York City; William J. Ganzel, of Carwood, N. J.; J. Keim Hetch of Brooklyn.

GILMORE, OHIO.—The Farmers' Mutual Telephone Company has been incorporated with a capital stock of $2,000. A. Parker, D. Gailbraith, Aaron Parker, W. F. Roberts and T. J. McCue are the organizers.

MAGNOLIA, OHIO.—R. R. Elson, J. H. Meitzer, M. J. Cooper, W. H. Maddrell and F. N. Randels have incorporated the Farmers' Tri-County Telephone Company with a capitalization of $5,000.

NEWARK, OHIO.—Edward Kibler, Robert W. Smith, Harry Swisher, Robbins Hunter and Charles E. Hollander have filed articles of incorporation for the Somerset Telephone Company, for the purpose of operating and constructing a telephone system in Somerset and vicinity. The capitalization of the company is $25,000.

SOMERSET, OHIO.—Articles of incorporation were recently filed for the Somerset Telephone Company. Edward Kibler, Robbins Hunter, R. W. Smith, Harry Swisher and C. E. Hollander, who is at the head of the Citizens' Telephone Company of Newark, are interested in the corporation. The company is capitalized at $25,000. An exchange will be built during the season and a farmers' line will also be built. The system will be operated in connection with the New Lexington exchange.

FREDERICK, OKLA. (Tillman county)—A charter has been taken out by a number of farmers residing in this neighborhood under the name of the Tesca Telephone Company, with a capital

stock of $1,000. The company will operate rural lines throughout this county. The incorporators are J. E. Smith, S. Dickey, S. Ellis, W. P. McIntyre, J. A. West and N. A. Chamberline of this place.

NIXON, OKLA.—The Nixon Telephone Company has been organized by C. S. Penfield, P. H. Tom and D. N. Campbell, with a capital stock of $6,300.

MARSHFIELD, ORE.—The North Coos River Telephone Company has been incorporated with a capital stock of $1,000, by John Hendrickson, James Landrith and Charles Mahaffy.

AUBURN, TENN.—The Home Telephone Company, with a capital stock of $3,000, was recently incorporated by B. R. McKnight, J. S. Odom, T. M. Bryan, W. R. Robinson and J. B. Adams.

AUBURN, TENN., (Cannon County)—B. R. McKnight, J. S. Odom, T. M. Bryan, V. R. Robinson and J. B. Adams are the incorporators of the Home Telephone Company The capital stock is $3,000.

IVY GAP, TENN.—The Ivy Gap Telephone Company of Jackson County has been incorporated by J. H. Davidson, E. S. Jackson, N. A. Roberts, J. F. Chesney and M. C. Billingsley. The capital stock is placed at $4,000.

WOODBURY, TENN.—A Home telephone company is in the course of organization in this place. $5,000 has been subscribed and B. F. Wood, county clerk, is engaged in canvassing for the new company.

ALUMWELLS, VA.—The McFadden Telephone Company has been incorporated with a capital stock of $5,000. A. A. McFadden is president; H. C. McFadden, secretary, and C. M. McFaddin and A. C. Nunley and J. H. Hagy, all of this place are directors.

CLAREMONT, VA.—The Harrison Telephone Company was recently incorporated with $5,000 capital stock. W. C. Webb, of Burrowsville, is president; W. W. Rich, vice-president; E. F. Harrison, secretary and treasurer. The two latter are of Claremont.

DISPUTANTA, VA.—With Thomas Temple as president; A. N. Cooks, vice president, and J. A. Hobbs as secretary and treasurer, the Disputanta Telephone Company has been incorporated with a capital stock of $5,000.

LA CROSSE, WASH.—Articles of incorporation have been filed for the La Crosse Telephone Company. The capital stock is listed as $3,500. E. S. Knowlton, Albert Guske, M. E. Schrecke, C. E. Hoover, J. H. Clarke, P. O. King and J. E. Moore are the incorporators.

VANCOUVER, WASH.—I. D. Eaton, W. W. McCredie, A. L. Miller, H. C. Phillips, C. C. Craig, H. M. Frienley and R. Tucker have organized and incorporated the Vancouver Home Telephone Company. The company is capitalized at $150,000, and will build and maintain a system in this city.

CECIL, WIS.—The Cecil & Green Valley Toll Line Company has been organized by W. C. Zachow, Henry Koeppen, Henry Boecher and William Peterman, with a capital stock of $2,500.

OCONTO, WIS.—The Oconto Telephone Company was organized recently with George A. Glynn as president; Yarwood Matravers, vice-president, and H. L. Reeves, secretary and treasurer. Incorporation papers have been filed with a capital of $5,000. As soon as the incorporation papers have been granted, construction will begin on a line through Pensaukee, Oconto and Little River, for the accommodation of the farmers in this vicinity.

APSLEY, ONT., CAN.—The Apsley Telephone Company has been incorporated with a capital of $10,000. The incorporators are D. Brown and Z. Tucker, of Apsley, and D. Davidson, of Peterborough, Ont.

ODESSA, ONT., CAN.—The Ernestown Rural Telephone Company has been incorporated J. F. Dawson is one of the incorporators.

THAMESVILLE, ONT., CAN.—The Thamesville Telephone Company has been incorporated with a capital of $10,000. The provisional directors are W. J. Mitton, of Camden, and T. Marven and J. Coutts, of this place.

ABERNATHY, SASK., CAN.—The Foster Rural Telephone Company has been incorporated with a capital stock of $5,000.

FINANCIAL.

EAST HAVEN, CONN.—The East Haven Telephone & Electric Company, at its annual meeting held recently, declared a 6 per cent dividend.

WESTMORELAND, KAN.—The Westmoreland Telephone Company has increased its capital stock to $8,000.

HARTWICK, MICH.—The Osceola Rural Telephone Company increased its capital stock from $3,000 to $6,000 .

DILLER, NEB.—The Diller Telephone Company, at a recent meeting, declared a 10 per cent dividend.

PATASKALA, OHIO.—The capital stock of the Pataskala Farmers' Telephone Company has been increased from $30,000 to $50,000.

MARFA, TEX.—The Marfa Telephone Company, formerly known as the Marfa Power Company, has increased its capital stock from $3,500 to $5,000.

HUBERTUS, WIS.—The Richfield, Hubertus & Holy Hill Telephone Company has increased its capital stock from $2,000 to $12,000.

FRANCHISES.

MITCHELLVILLE, IA.—The Rural and 4 City Telephone Company has been voted a franchise to operate a telephone system in this place. The company now has franchises for Prairie City, Altoona and Mitchellville.

WINCHESTER, IND.—The Eastern Indiana Telephone Company, with headquarters at this place, has secured a franchise to operate a system in Saratoga, Ind. The exchange there will be entirely rebuilt and it is expected that a new building will be erected and new equipment will be installed.

NEOSHO, MO.—The Farmers' Union Telephone Company is seeking to obtain a franchise for the construction of a telephone system.

ERICK, OKLA.—The Walker Telephone Company has been granted a franchise to construct and maintain a telephone system in this place, the franchise extending for 21 years.

JACKSONVILLE, ORE.—The Citizens' Telephone Company has been granted a franchise to build and operate a system in this city and to connect with rural lines already here; also to build connecting lines to Central Point, Medford, Phoenix and several other small towns in the Rogue River Valley.

CONSTRUCTION.

CORNING, ARK.—The Corning and Pocahontas Telephone Company has finished a new line direct from Corning to Success. Formerly the line went through Palatka and Datto.

RAVENDEN SPRINGS, ARK.—The Farmers' Mutual Telephone Company, which has been doing business in Randolph county, is installing a 50 drop switchboard in this place.

WASHINGTON, GA.—The Washington Telephone Company will spend about $5,000 for improvements, including new creosoted poles and the replacing of the open wires with cable.

PATON, IA.—The contract for a new exchange building has been let by the Mutual Telephone Company.

REINBECK, IA.—The Traer Mutual Telephone Company will install a new switchboard in the local exchange and make other improvements.

ROWEN, IA.—The Rowen Rural Telephone Company has purchased a 100 drop switchboard of the most modern type.

WALLACE, IDAHO.—Officials of the Interstate Telephone Company of Spokane, and the Montana Independent Company of Missoula, Idaho, recently met in conference at Wallace to draw up a contract for the connection of the two lines at the Idaho border. The Spokane company's long distance lines run to Wallace, while the Montana company is building to Wallace by way of Anaconda, Deer Lodge and Missoula.

HAMBURG, ILL.—The Merida Telephone Company reports that it will lay a cable across the Mississippi River at Hamburg and extend a line from the west bank to Elsberry, Mo. This will be a great improvement in the long distance service.

ONARGA, ILL.—The local telephone company contemplates rebuilding its system, installing new and modern equipment. In order to do this, it is proposed to raise the rates.

COLUMBIA CITY, IND.—The Whitley County Telephone Company has completed arrangements for a complete readjustment of its service and equipment in this city and to South Whitley. The city exchange is to be moved to larger quarters in the Peabody building. A new switchboard of modern type is to be installed. All wires are to be run in cables, and all poles will be placed in the alleys. The work is to be done under the direction of Manager Pogue.

DECKER, IND.—The plant of the Wabash Home Telephone Company at this place has been entirely rebuilt.

INDIANAPOLIS, IND.—The Western Union Telegraph Company, which owns the poles and wires, has a force of expert telephone men installing telephones in each of the twenty-eight blocks on the line of the Big Four Railroad between this city and Cincinnati. When this is completed, the telephone will entirely supplant the telegraph in the dispatching of trains on this line.

SOUTH BEND, IND.—The directors of the South Bend Home Telephone Company have authorized the expenditure of $30,000 on improvements and extensions to the company's service.

DETROIT, MICH.—At a recent meeting of the board of directors of the Home Telephone Company financial plans were perfected for practically doubling the present capacity of the system. Facilities for 10,000 additional telephones will be provided for at once which will bring the number of Home telephones in operation in Detroit up to 25,000. Reports showed that the company's traffic had doubled in the past four months. Plans are being perfected for the establishment of closer relations between the company and the Independent state lines.

BUTTE, MONT.—The Montana Independent Telephone Company expects to begin operations in Stevensville within a short time. Communication will also be had with Missoula and other portions of the state. An exchange is to be built in Stevensville immediately and it is expected that the toll line from the valley to Missoula will be ready for operation by the time the exchange is completed.

JUDITH GAP, MONT.—The switchboard of the local telephone company was recently installed and the system placed in operation with 30 telephones.

STANFORD, MONT.—The Mutual Telephone Company is constructing a line from Windham to Stanford, and it is expected that later it will be extended to Denton.

BRISTOW, NEB.—At a recent meeting of representatives of the Fairfax Mutual Telephone Company, the Spencer Independent Telephone Company and the Bristow Mutual Telephone Company, it was decided to build a copper toll line from Lynch to Bonesteel, and later extend to Dallas.

BELLE FOURCHE, S. DAK.—Work has been started on the construction of a line between this city, Camp Crook and Buffalo by the Belle Fourche & Northern Telephone Company. It is intended later to construct a line from Buffalo to Bowman.

TAYLOR, S. D.—The Taylor Telephone Company recently installed a new switchboard in the local exchange.

WHITE ROCK, S. D.—The White Rock Rural Telephone Company will extend its lines to Diamond this coming season.

INDIAN MOUND, TENN.—The lines of the Indiana Mound Telephone Company are being extended. Two new lines are about completed into Lee Hollow. Mr. T. W. Seay is president of the company and Dr. C. N. Keatts, secretary and treasurer.

WENATCHEE, WASH.—The Farmers' Telephone & Telegraph Company will expend about $15,000 in improving its local service. The service wires to Cashmere and Monitor will be doubled, increasing the efficiency of service to these points. The lines to localities adjacent to Wenatchee will also be improved.

APPLETON, WIS.—The Fox River Valley Telephone Company has plans prepared to extend its lines to Morrison and Pine Grove. Wires will be run from De Pere to Greenleaf, using the poles now up, to that place. From Greenleaf on a line of new poles will be set.

CARLSBAD SPRINGS, ONT., CAN.—The Gloucester Township Telephone Association, a newly formed organization, has been granted permission to erect a line from Carlsbad Springs along the Russel road. A. Childs of Carlsbad Springs is president, and J. O. Hodgson, secretary.

ROSEWOOD, MAN., CAN.—At a meeting of the Rosewood Rural Telephone Company, of which Mr. G. Claydon is manager, it was decided to build a line to Ste. Anne.

ELECTIONS.

EAST HAVEN, CONN.—Stockholders of the East Haven Telephone Company met recently and the officers were elected, being the same as were in office the past year. George C. Kirkham, J. E. Robinson, S. K. Chidsey, H. C. Nickerson, and F. B. Street are the directors.

BEACH, N. DAK.—Officers for the Golden Valley Telephone Company have been elected as follows: President, C. J. Kopan; vice-president, J. P. Smith, and secretary, H. L. Wheeldon.

ABEYVILLE, KAN.—Mr. Schwitter was elected president; Howard King, secretary, and E. Bridgeman, treasurer of the Farmers' Telephone Company at the recent meeting.

PERRY HILL, KAN.—The officers elected by the stockholders of the Prairie Dell Telephone Company at their annual meeting are: Wesley McClelland, president; Robert Sullivan, treasurer; Bert Baker, general manager, and C. F. Barth, secretary.

GREAT FALLS, MONT.—Officers were elected at the semi-annual meeting of the Cascade County Rural Telephone Company as follows: President, I. W. Thrasher; vice-president, Joseph Young; secretary, Warren W. Moses; treasurer, Victor Ario. Directors are R. W. Berry, John Mainland, I. W. Thrasher, Herman Johnson, Victor Ario and Joseph Young.

CLINTON, MO.—The stockholders of the Missouri Union Telephone Company held their annual meeting recently and elected directors and officers. E. Willoughby is president; J. M. Spangler, first vice-president; F. C. Livingston, second vice-president; G. W. Schweer, secretary and manager; Dr. S. T. Neill, manager, Clinton exchange; R. E. Majors, treasurer. These with W. E. Huston, J. H. Avery, A. J. Osborn and W. F. Hall are the directors.

HEDGEWOOD, MO.—Officers elected by the stockholders of the Hedgewood Telephone Company are: President, Henry Warrenbrock; treasurer, Robert Hohinwald, and secretary, C. H. Killion.

LEVASY, MO.—The stockholders of the Levasy Telephone Company have elected these officers for the ensuing year: President, H. A. Meinershagen; vice-president, Henry Borgman; secretary and treasurer, B. Bickel. The company has recently run a line directly from Levasy to Sibley.

NORBORNE, MO.—At the annual meeting of the Stet-Rockingham and Norborne Telephone Company, the stockholders elected officers as follows: S. E. Hogan, president; A. Hilton, vice-president, and John Baley, secretary and treasurer. These with T. D. White, Leopold Shutz, Isaac Paul, S. P. Clemens, J. H. Shickey and Geo. T. Temple are the directors of the company.

SANTA FE, N. M.—The stockholders of the New Mexico Telephone Company have elected officers as follows: Mrs. H. W. Warner, president; John K. Stauffer, vice-president, and H. A. Hart, secretary and treasurer.

SYRACUSE, N. Y.—The annual meeting of stockholders and election of directors of the Onondaga Telephone Company was held recently and the present board of directors was re-elected. On the board are Senator Hendrick S. Holden, John B. Pierce, George Fuller, Edward W. Peck, James W. Taylor, A. H. Cowie and W. Roy McCanne. The officers named were: President, Mr. Cowie; vice-president, Mr. Fuller; secretary and treasurer, Mr. McCanne; general manager and assistant treasurer, Mr. Pierce.

WILLIAMSON, N. Y.—The Wayne-Monroe Telephone Company recently elected officers as follows: President, Geo. F. Waters, Putneyville; vice president, Albert Yeomans, Walworth; secretary and treasurer, Frank D. Gaylord, Solius. The directors are the above mentioneed with Dr. R. S. Carr ,Williamson; Dr. J. S. Brandt, Ontario; Dr. Robert Morris, Walworth; Geo. R. Miles, Walcott; Peter F. Osborn, Ontario, and Willis P. Regan of Williamson.

COLLINS, OHIO.—Officers elected to serve the Townsend Telephone Company are: A. B. Kittinger, president; John Liles, vice-president; George N. Helling, secretary and Elias Jarrett, treasurer.

GALION, OHIO.—The annual meeting of the stockholders of the Galion Telephone Company was held recently and officers were re-elected as follows: President, Mark Cook; vice-president, A. A. Whitney; secretary, S. M. Wolf; treasurer, J. W. Cupp. The company enjoyed a nice year's business and besides paying the usual dividend on preferred stock, a surplus was set aside for betterment of the service.

MT. VERNON, OHIO.—The following directors were elected at the annual stockholders' meeting of the Mt. Vernon Telephone Company: Frank L. Beam, W. P. Bogardus, P. S. Kelser, H. C. Devin, R. G. McClelland, B. D. Heron and Edward O. Arnold.

SALEM, OHIO.—The Columbiana County Telephone Company held its annual meeting recenily and officers elected were, James S. Brailey, Jr., of Toledo, president; W. C. Morron, Lisbon, vice-president; W. L. Cary, Jr., Cleveland, secretary, and H. B. Taylor, Cleveland, treasurer. Directors: E. G. Tillotson, C. E. Stinson, and A. M. Richardson.

ZANESVILLE, OHIO.—The following officers have been elected to serve the Zanesville Telephone Company for the ensuing year: President, James S. Brailey, Jr.; vice-president, S. M. Granger; secretary, J. B. Rhodes; treasurer, H. B. Taylor; general manager, J. B. Rhode. With these, E. G. Tillotson, C. E. Stinson, H. A. Sharpe, C. A. Potwin and W. L. Cary, Jr., are the directors.

CLINTON, WIS.—At a meeting of the board of directors of the Clinton Telephone Company held recently, the following officers were elected: President, Byron Smith; vice-president, O. L. Woodward; secretary, C. W. Colliver, and treasurer, H. A. Moehlenpah.

JEFFERSON, WIS.—The annual stockholders' meeting of the Jefferson Mutual Telephone Co npany was held recently and these officers were elected: President, J. M. Bienfang; vice-president, O. F. Roessler, and secretary-treasurer, R. B. Hellen.

MISCELLANEOUS.

VOLLMER, IDAHO.—The Lawyers' Canyon Telephone Company, owned by farmers in this district, has completed connections made with the Nez Perce Co-Operative Telephone Company. The line is 15 miles long.

ROBINSON, ILL.—Mr. J. D. Doty, an old time lineman of Robinson, Ill., met with a very serious accident recently. He, with several others, was engaged in taking down an old terminal pole. When it became necessary to go to the roof he stepped from the top of the pole, which stood very close to the building. He was gone only a few moments, but in the meantime one of the other linemen loosened the top arm, but did not remove it, so it appeared to still be secure. On his return to the pole Mr. Doty stepped off the roof and took hold of the top arm with both hands, with the result that the loose arm came off, throwing him backwards to the ground, a distance of 30 feet He suffered serious injuries, having both arms broken and his face and hands were badly cut, but at last reports he was doing very well.

FORT WAYNE, IND.—The Home Telephone Company is defendant in a suit instituted by the city to collect a tax of $1.00 per pole, the back tax amounting to several thousand dollars. The company insists that such a tax is double tax, as it already pays a city, county and state tax.

MARTINSVILLE, IND.—The City Council has granted the Martinsville Telephone Company a new franchise, extending the company's rights 25 years. It also gives the company the right to increase rates to $15.00 for residence and $27.00 for business service, and when it secures 1,000 subscribers to increase each class of service $3.00 a year. Upon the increase of its rates, the company will instal a new, up-to-date system and place all wires in the business district underground.

ST. JOSEPH, MINN.—M. J. Rooney, of St. Wendel, who controls the local telephone exchanges at Avon and Holdingford, has agreed to put in an exchange at this place. Farmers living in this vicinity have pledged their support to the undertaking and the exchange will start with 140 telephones.

PIQUA, OHIO.—The Home Telephone Company sustained a loss of about $40,000 by fire recently. The entire switchboard was in flames, but the 12 operators on duty got out without injury. The city was cut off from long distance connection for a time, and the local service has been abandoned until the exchange can be rebuilt. About 1,200 telephones were put out of service by the fire. The building in which the exchange was located was not seriously damaged.

MARFA, TEX.—The Marfa Power Company has filed an amendment to its charter changing its name to the Marfa Telephone Company.

HUBERTUS, WIS.—The Richfield, Hubertus and Holy Hill Telephone Company has changed its title to the Hubertus Telephone Company.